DOCUMENT RESUME

ED 075 334 SO 005 893

AUTHOR	Thayer, Lee; And Others
TITLE	Toward a Reconceptualization of Knowledge Utilization in Education. Volume 5. Research Memoranda. Final Report.
INSTITUTION	Iowa Univ., Iowa City. Center for the Advanced Study of Communication.
SPONS AGENCY	National Center for Educational Communication (DHEW/OE), Washington, D.C. Div. of Practice Improvement.
PUB DATE	Jan 73
CONTRACT	OEC-0-72-0243(519)
NOTE	120p.
EDRS PRICE	MF-$0.65 HC-$6.58
DESCRIPTORS	*Communications; Democracy; Educational History; *Information Dissemination; Information Systems; *Information Theory; *Information Utilization; Public Education

ABSTRACT

Volume five continues with research memoranda numbers seven, eight and nine. (The general nature of the memoranda and related documents are described in SO 005 892). Research Memorandum #7, "Knowledge Utilization in Education: A Review of Significant Theories and Research," by Mary Trapp provides a background sketch of theories and research specifically about knowledge utilization in the public education system in the United States. The paper defines the problem, presents significant theoretical approaches, discusses research, presents pertinent media theory and research, and places the Center's study in the context of existing theories of knowledge utilization. Research Memorandum #8, "U.S. Education: A Look at Social, Political, and Ecoromic Constraints Accommodated by Democracy for the Teacher" by Ed McLuskie, offers the thesis that practiced democracy is historically a major source of social, political, and economic constraints for the teacher in the formal U.S. education enterprise. Major constraints are explained in terms of sheer numbering, standardized materials, State Boards of Education, Local School Boards, Community and Peer Social pressures, and teacher education. The last memorandum in this volume, "Essays on Communication and Education" by Tom Deats, discusses topics concerning developing human relationships; facilitating learning through simulation, and educators and information systems. (Author/SJM)

ED 075334

Final Report

Contract No. OEC-0-72-0243 (519)

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Toward a Reconceptualization of Knowledge Utilization in Education

Volume 5 of 8 Volumes

January, 1973

SP005 893

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Office of Education

National Center for Educational Communication
(Division of Practice Improvement)

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Project: NCEC Knowledge Utilization Study

Research Memorandum #7:

"Knowledge Utilization in Education: A Review of Significant Theories and Research"

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PURPOSE AND STRUCTURE OF PAPER

The purpose of this discussion is to provide a background sketch of theories and research specifically about, or pertaining to, the subject of knowledge utilization in the public education system in the United States.

The paper is organized in sections in which, first, the problem is defined; second, significant theoretical approaches are presented; third, research is discussed; fourth, media theory and research as it pertains to the process of knowledge utilization in education is presented, and fifth, the study of which this paper is a part is placed in the context of existing theories of knowledge utilization.

Any attempt to discuss theories and research in a subject as ambiguous and wide-ranging as knowledge utilization must be less than comprehensive. This paper does not presume to be definitive; it presents, at best, a sketch based on the author's subjective decisions as to theories and research significant to the study of which this paper is a part. Readers interested in the subject and who wish a more comprehensive literature review are directed to Ronald Havelock's Planning for Innovation Through the Dissemination and Utilization of Knowledge.[1]

STATEMENT OF PROBLEM

In its simplest form, the problem of knowledge utilization in education is the question of how and why existing information comes to be considered "useful" by educational practitioners, and how it is subsequently applied by practitioners. In much of the literature on the subject, "existing information" is narrowly defined as "existing scientific research findings."

An underlying assumption of the entire question seems to be that such

information should be "used." In Havelock's words, there exists "... the growing expectation on the part of industrial executives, government leaders, and the general public that most, if not all, of our storehouse of scientific knowledge should be useful to man."[2]

Utilization of existing techniques, tools, and ideas--of "information"--has a relatively short but productive history of study. The bulk of the literature has been generated in the fields of educational innovation, agricultural innovation, medical information dissemination, and technology utilization, the latter with emphasis on military technology.

Subsumed under the term "knowledge utilization" in education are such diverse areas of concern as application of research, diffusion of research information, educational change, educational innovation, creative teaching methods, dissemination of information, adoption, utilization, development, production, evaluation, and technical and technological skills. All have something to do with knowledge utilization in education, making the concept very difficult to define. In this paper, the term will be understood to mean adoption of existing techniques, tools, information and ideas by some educational practitioner. The author is aware that this may be too narrow an understanding, for it presupposes the existence (or production) of information and the existence of a dissemination structure, that is, of an information system.

Knowledge utilization in education cannot be understood apart from its context. Accordingly, the informational structure of the American educational system will be briefly examined. Who produces the information in the system; who disseminates it, and who uses it? Two levels should be distinguished. First, there is the level at which the entire environment is the information source, the teacher is the disseminator, and the student is the adopter or

user. More to the point of this paper, however, is the level at which educational researchers produce scientific information, dissemination is accomplished through various information systems, and educational practitioners utilize the information to change (generally, with intent to improve) the teaching of children.

At the second level discussed above, a fact that becomes apparent is the complexity of the American formal educational system as an "information" system. Sam D. Sieber[3] recognizes five primary sources of educational information: university-based research units, regional educational laboratories, research units within state departments of education, research units within local school systems, and private testing and research organizations.[4]

Thomas D. Clemens recognizes three primary audiences for such educational information, specifically, other researchers, educational decision-makers and practitioners, and the general public.[5] These audiences are provided with information about educational research through a dissemination network comprising professional associations and organizations and their journals, other publications, and conventions; universities and their publications, extension services and instructional activity; government agencies, including local school districts, state education agencies, and the federal government with its various information services and administrative agencies; private publishers; foundations, and the mass media.

This dissemination network includes the university-based educational research and development (R&D) centers and the regional educational laboratories administered by the Office of Education. Generally, the R&D centers are concerned with production and refinement of new information in education, while the educational laboratories are concerned with application of new information to existing educational situations. In addition, the Office of

Education operates the Educational Resources Information Center (ERIC), an information system which receives information through a network of clearinghouses, makes it available to researchers and practitioners who can learn what is in the system through either hand or computer search techniques, and offers either hard copies or microfiche copies of the information to users.

Mention of the R&D centers, of the regional labs, and of ERIC, suggests that efforts have been made to implement a national system of information dissemination which will allow educational practitioners to find out about and use the products of educational research. Nevertheless, sentiment is that the system is not achieving the results its planners envisioned. In large part, this may be due to the nature and structure of the American educational system. Sieber remarks, "Because of the pluralistic nature of education in the United States, a single, monolithic educational research information system has not developed, nor is it likely to develop."[6] Many explanations of the knowledge utilization process in education have been presented, however, and a review of the major ones may suggest why the American educational system processes information the way it does.

THEORETICAL APPROACHES

In educational research, the significant early theory and research bore the mark of one man, Paul Mort.[7] Mort's work was in the area of diffusion research. Time, that is, the relatively large amount of time required for the diffusion and adoption of an idea within the educational system, was a key concept underlying his research. Mort gave credibility to the concept of time lag in educational diffusion. He wrote:

> Following an important discovery such as the one made at the turn of the century--that the theory of formal discipline is untenable--we may expect a long adjustment period characterized by thousands of inventions of know-how designed to put the insights into operation. The latter part of this period will be more prolific than the early part. It is out of the accumulation of inventions that new composite inventions or designs emerge.[8]

Mort posited a four-stage diffusion and adoption process, beginning with insight into a need, introduction of a way of meeting the need, diffusion, and adoption.[9] He gave due weight to environmental pressures on the school system. He argued that the best schools of the future could be discovered piecemeal in the operations of the schools of today and that "The golden strand among the bundles of haywire about us would appear to be adoption of responsibility by the school that all children shall learn, and the giving up of the guiding principle of offering opportunity that was adequate for the 19th century.[10]

Mort's influence and his emphasis on environmental influences are recognized by Richard O. Carlson,[11] who also recognizes a shortcoming in Mort's work. Carlson writes:

> . . . the study of the spread of educational practices bears the mark of one man. The late Paul Mort and his students seemed almost to have cornered the market on educational diffusion studies. This last feature has, however, apparently permitted a . . . very important characteristic of such studies: an implicit assumption that characteristics of chief school officials are unimportant in explaining rates of adoption of innovations.[12]

What Mort started, many have continued. In the literature that has been generated in the area of educational diffusion, adoption and utilization of information, Havelock has isolated three major paths of thought about, or three basic theoretical approaches to, the knowledge utilization process. His categories will be adopted here and an attempt will be made to discuss briefly representative educational theorists of each approach. The three approaches as defined by Havelock are the research, development and diffusion perspective, the social interaction perspective, and the problem-solver perspective.

Of these three theoretical perspectives, the dominant one has been the research, development and diffusion model (see Model 1, Appendix A). This model reflects stimulus-response assumptions and encourages research emphasis on the producer and "controller" of information. Reasons for its dominance are many.

It builds on the early work in agricultural diffusion and thus has a credible scientific base, even though, as Sieber argues, the unique characteristics of the educational system indicate that research in other fields does not necessarily transfer to the educational system.[13]

In an admitted over-simplification, this perspective is compatible with the American bias toward "unphilosophical pragmatism,"[14] which assumes that provision of information and ideas is sufficient to insure utilization, since rational men will seek out the best information available for any problem. This assumption is supported by the social communication theory expressed in the formula of the open marketplace of ideas, which is manifested in American political-legal institutions.

The linear, sequential nature of the research, development and diffusion perspective is supported, too, by the more technical ideas of traditional communication theory, including the linear, mathematical Shannon-Weaver model, which uses source, message, channel and receiver as its dominant elements, and the Lasswellian verbal formula of who says what to whom in which channel with what effect. In addition, the perspective reflects a mechanistic bias in American society which encourages emphasis on technology. The roots of this may be found in the British philosophical development of laissez-faire individualism. The philosophy, developed during the rise of industrialism and transplanted in America, assumes an essentially mechanistic, Newtonian view of the universe.

The support for this theoretical perspective is thus impressive, but it suffers one flaw: it doesn't seem to satisfactorily explain the phenomenon of knowledge utilization. If the justification and role of theory is its broad explanatory and predictive power, and its ability to suggest relationships, a theory which assumes rational action as the human norm would seem to ignore significant elements of human experience. Havelock says of the RD&D perspective:

> It seems to be a particularly popular and appropriate model for dealing with D&U issues at the macrosystemic and policy levels . . . because it subdivides the knowledge flow system neatly into different functional roles which exist within different subcultures (e.g., the research community, the product organizations, the practitioners, the consumers). It does appear to supply much of the rationale for current policy planning in the U.S. Office of Education.[15]

Representative proponents of the research, development and diffusion perspective in education are Henry Brickell and Egon G. Guba. Brief descriptions of their approaches will be presented below.

Brickell,[16] based on his research with the New York state educational system, developed a three-part model of the change process in education. The three phases are design, evaluation, and dissemination of innovations. In Brickell's words:

> Program design is the translation of what is known about learning into programs for teaching. The ideal circumstances for the design of an improved instructional approach are artificial, enriched, and free.[17]

> Program evaluation is the systematic testing of a new instructional approach to find what it will accomplish under what conditions. The ideal circumstances for the evaluation of a new instructional approach are controlled, closely observed, and unfree.[18]

> Program dissemination is the process of spreading innovations into schools. The ideal circumstances for the dissemination of a new approach through demonstration are those which are ordinary, unenriched, and normal.[19]

Underlying concepts in Brickell's model of the educational change process are the essential stability of the system and the harmony, or interdependence, of the system with other parts of the society. Change, thus, is the exception rather than the rule, but failure to change is not totally the product of external societal pressure. Brickell says, "The public is not an anchor holding back an eager profession. Community expectations and professional ambitions are usually in reasonable harmony with each other."[20]

Guba[21] is a second major proponent of the research, development and diffusion model. He posits a four-category theory-research continuum, consisting of research, development, diffusion, and adoption.[22]

For Guba, research comprises depicting, relating, conceptualizing and testing; development comprises depicting, inventing, fabricating, and testing; diffusion comprises telling, showing, helping, involving, training, and intervening, and adoption comprises trial testing, installing and institutionalizing.[23] Central to Guba's conceptual framework is the assumption that research and practice are two distinct activities within distinct communities, and that middlemen have to be trained to connect the two.

Though the research, development, and diffusion perspective on knowledge utilization may be faulted for its mechanical, linear bias, criticism of it must be qualified, as Havelock recognizes:

> In criticism, the RD&D model can be said to be over-rational, over-idealized, excessively research oriented, and inadequately user oriented, but because it has been laid out so concretely by Guba and his colleagues, it gives other educators something to shoot at figuratively as well as literally. [Dr. Frank] Chase, for example, has suggested that Guba and company may have been most useful to education in arousing colleagues to come forth with alternative conceptualizations.[24]

While the research, development and diffusion model concentrates on the knowledge producer, the second major perspective, the social interaction perspective, concentrates on the relationships between producer and user (see Model 2, Appendix A). This model, based on anthropological, sociological and social psychological thought, has contributed to educational theory the distinction between formal and informal communication channels, the concept of the opinion leader, and the concept of the reference group as a major determinant in adoption and change of attitudes. It encourages research emphasis on the organizational aspects of the educational change process.

Representative theorists in this perspective are Everett Rogers,[25] Carlson, and Mort. Rogers is most widely known for his work in rural sociology, but he has also given some thought to the knowledge utilization process in education.

The very fact of his background in rural sociology lends credibility to Rogers' discussion of the possible inapplicability of such research to education. He notes that " . . . we have tended to view schools as if they were farmers, innovation-wise."[26]

Rogers gives needed emphasis to the inhibiting effect that traditional concepts and research can have on conceptualization of the knowledge utilization process. This is evident in his discussion of the inapplicability of rural sociology to education. ("Strange," he writes, "that the study of innovation has itself been so traditional."[27]) Rogers would change the educational research emphasis from the process between schools to inspection of what goes on within each unique school system, and would adopt the methodologies of relational analysis and structural effects. Using these methods he would study diffusion effects variables, communication variables, social system variables, and consequences variables.[28]

Rogers is especially interesting because of his emphasis on the communicational nature of the knowledge utilization process. ("There is hardly any need at this point to discuss the importance of communication in the diffusion process. Diffusion is a communication process."[29]) A central concept in Rogers' work is that of stages of adoption over time. In a social group the continuum progresses from innovators to early adopters, early majority, late majority, and laggards. Rogers conceives of stages of adoption within the individual, also. An individual progresses from awareness to interest, evaluation, trial, and adoption.[30] This concept is compatible with the basic conceptualization of time and time lag as developed by Mort.

Carlson conceives of the diffusion process as involving interaction among people. He takes issue with theoretical emphasis on environmental determinants to the exclusion of consideration of influences of individual interaction through

informal communication channels. At the same time, however, he avoids the overly-individualistic idea that environmental aspects are of minimal importance. The emphasis is on the relationships between individuals within systems. These relationships may constrain action but such constraints can also be changed or disregarded by the individuals involved. Carlson's interaction perspective can be seen in his statement:

> Social structure involves the relations that exist among people. It is defined in terms of the distribution and differentiation of statuses, roles, and patterns of interaction or communication among members of a social system. . . . the spread of new ideas takes place in a social network in which the act of acceptance by an individual seems to influence others . . . .[31]

Rather than conceiving of adoption as a phenomenon occurring to discrete individuals, Carlson tends to view it as a chain reaction with cumulative effect.[32]

The social interaction perspective of knowledge utilization in education emphasizes the relationships between participants in the system. It thus encourages a shift in research emphasis from the information producer, with the connotation of a producer-controlled system that such an emphasis supports. Havelock suggests, however, that the social interaction perspective gives too little emphasis to psychological factors in the utilization process.[33]

The third major perspective defined by Havelock is the problem-solver perspective which is user-oriented (see Model 3, Appendix A). Based on psychological theory, it ". . . rests on the primary assumption that knowledge utilization is a part, and only a part, of a problem-solving process inside the user which begins with a need, and ends with the satisfaction of that need."[34] The problem-solver perspective encourages research emphasis on the psychological processes that lead to perception of a problem and to utilization of existing information or invention of information to provide a solution to the problem.

Representative theorists in this perspective are Ronald Lippitt[35] and Matthew Miles.[36]

Lippitt's psychological approach is evident in his analysis of significant differences between education and the fields in which most diffusion and adoption research has been done. Lippitt writes:

> . . . in education, I believe, most of the significant changes in practice imply and require some changes in the attitudes and skills and values of the practitioner in order for the change to be a successful adoption and adaptation. Typical change in agriculture--a new seed, a new insecticide, a new fertilizer--does not require any basic change in the attitudes and values of the farmer in order for him to be a successful utilizer of these innovations. . . . The same is true if one reviews most of the new industrial inventions, and the same is true of most of the new developments in medicine--that they do not require major value changes, attitude changes or skill changes on the part of the practitioners. Yet we find most new teaching practices require significant psychological changes and skill acquisitions by the adopter and adapter.[37]

The change process in education is conceived of by Lippitt as a seven-step process: the development of a need for change; the establishment of a change relationship; clarification or diagnosis of the client system's problems; examination of alternative routes and goals, and establishment of goals and intentions of action; the transformation of intentions into actual change efforts; the generalization and stabilization of change, and the achieving of a terminal relationship.[38]

Although Miles argues that an innovation may be initiated by either the receiver or someone outside the system, he focuses on the receiver-based processes necessary to bring about adoption. He describes four stages leading to the adoption of an innovation. These are design, awareness-interest, evaluation, and trial.[39]

Advocates of the problem-solver perspective have done much to minimize the disregard to the user which is a prime drawback in the research, development and diffusion model, but this perspective, too, suffers some shortcomings: ". . . first, it puts excessive strain on the user; second, it minimizes the role of outside resources; and third, it does not provide an effective model for mass diffusion and utilization.[40]

Havelock, who feels that all three of the dominant models of the knowledge utilization process have something to recommend them, attempts to draw together the best elements of the three perspectives in his linkage model (see Model 4, Appendix A). He writes:

> The concept of linkage starts with a focus on the user as a problem-solver. We must first consider the internal problem-solving cycle within the user . . . there is an initial "felt need" which leads into a "diagnosis" and "problem statement" and works through "search" and "retrieval" phases to a "solution", and the "application" of that solution. But as we see . . . the linkage model stresses that the user must be meaningfully related to outside resources.[41]

The discussion presented here has briefly considered four approaches to the knowledge utilization process in education: research, development and diffusion; social interaction; problem-solving, and linkage. Of the authors mentioned, none can be given adequate treatment within the scope of this paper. The necessary exclusion of many theorists is not intended to imply that their work is of no value. Rather, an attempt was made to describe representative theories which would suggest typical conceptualizations of the knowledge utilization process. The reader is directed to the Havelock study for a definitive treatment of the literature in the field.

A further qualification must be made. The perspectives presented drew from recognizable theoretical disciplines--the research, development and diffusion perspective largely from the empirical tradition of agricultural diffusion and rural sociology, the social interaction perspective from the fields of anthropology and sociology, and the problem-solver perspective most heavily from psychology. That conceptualizations based on other disciplines, such as history, political science, or economics, have not been presented here should not imply that such conceptualizations would not offer valuable insights into the knowledge utilization process in education. That they have not been presented merely indicates that the literature did not reflect strong concern with these disciplines.

If the problem at hand is utilization of educational research by the educational practitioner, a brief description of the nature of educational research in the United States may suggest some incompatibilities between the research community and the educational system. (These incompatibilities may also be conceived of as the tension between pure and "applied" science.) Guba and John J. Horvat identify seven characteristics of educational research. It is loosely organized, university-based, individually directed, theory oriented, committed to experimentalism, conducted primarily by persons trained in a psycho-statistical tradition, and a part-time pursuit.[42] Changing the existing educational research system to make it more relevant to the practitioner may be one step in encouraging use of its products by practitioners.

Carlson provides an overview of the state of educational research in the areas of diffusion and adoption, noting that, while research in these areas is extensive, the areas ". . . describe only a very narrow slice of the world of change in education."[43] Carlson's definition of the diffusion process seems similar to this writer's understanding of the meaning of knowledge utilization. Therefore, the definition will be presented below and Carlson's conclusions about research into each part of the process will be reported. He notes that no single diffusion study considers all aspects of his definition, and that, generally, diffusion research tends to ignore channels of communication, social structure and value systems.[44] Carlson's definition is:

> . . . the process of diffusion is . . . the (1) acceptance, (2) over time, (3) of some specific item--an idea or practice, (4) by individuals, groups or other adopting units, linked to (5) specific channels of communication, (6) to a social structure, and (7) to a given system of values or culture.[45]

A primary problem with research into acceptance is the vagueness of the term, whose meaning can range from <u>first</u> use to <u>full</u> use of some item. Thus, comparability

of studies in this area is suspect. In addition, educational research has slighted the aspect of decision-making in the acceptance process.

Diffusion is a process that occurs over time, yet few studies have identified this part of the process. This is due partially to the poor quality of record-keeping in the educational system, which has forced researchers to rely on the recall of persons questioned. Early research measured amount of adoption rather than rate of adoption.

Innovations can be either practices or ideas, but educational research has concerned itself mainly with the diffusion and adoption of practices. Researchers are further hampered by the tendency of practitioners to modify or adapt new practices while adopting them. Carlson suggests, "The basic problem is that no one seems quite sure what are the relevant dimensions of an educational innovation. And no one has tried very hard to find out."[46]

Research into adopting units has focused on the local school system rather than on the individual teacher. The second common orientation of researchers into this aspect of adoption and diffusion ". . . consists of elements rather loosely connected to what might be called communication theory; notably the two-step flow of communications hypothesis."[47] Although researchers have defined the adopting unit as the local school system, most have ignored the fact that the local school system is a complex organization, and have not utilized organizational theory to any great extent.

Referring to the study of communication channels, Carlson remarks that ". . . overall the neglect of communication is rather awesome."[48] As he defines them, adoption studies presuppose communication but need not directly consider it, so Carlson classifies most educational innovation research as adoption studies. Diffusion, he suggests, can be conceived of as either process or product. Conceiving of it as a process would require research into how innovations spread

and would focus on communicational aspects, but most research has conceived of diffusion as a product. This product orientation in educational research encourages such findings as that diffusion occurs at different rates and that time lag exists, findings which Carlson describes as "virtually useless."[49]

Carlson's conclusion to the section on communication channels is of interest to the student of communication. He writes:

> . . . it is not, strictly speaking, until one is concerned with individual adopters that the questions pertaining to various uses of channels of communication become meaningful. School systems do not send, receive, nor fall under the influence of communications; only people do. As long as the school system is taken as the adopting unit and until attention is given to who plays what part within a school system in the adoption decision, the neglect of the part played by communication will continue. . . .[50]

Carlson notes that social structure has been ignored as decisively as has been communication, and for the same reason--that the school system has been taken as the adopting unit, but that social structure deals with relationships between and among people, not between and among school systems.

Research into the system of values or culture would give some basis for evaluating the relative worth of a given educational innovation in terms of the needs or desires of the people it will affect. Carlson feels that no educational researcher has considered this aspect of the adoption and diffusion process.

Given the extensiveness of the research in the area of educational adoption and diffusion, the more specific discussion of research will be highly selective and will emphasize the information-seeking behavior of educational practitioners. (A list of general conclusions drawn from research on research utilization is presented in Appendix B.)

A portion of the research done in the area of information-seeking behavior concentrates on the source of information. Two types of sources have been distinguished: first, personal, local, and informal sources; second, impersonal, non-local or cosmopolite, and formal sources. Generally, early adopters favor

impersonal, cosmopolite and formal sources, while late adopters favor personal, local and informal sources.[51]

In addition, it has been found that one's attitude toward the source of information affects one's judgment about the usefulness or validity of such information. Early adoption of scientific research indicates a favorable attitude toward the scientist.[52] In education, it has been found that practitioners tend to feel that scientific research is not relevant to their problems; therefore, the information it produces is not deemed very significant.[53]

Information seeking can be conceived of as search behavior, but it also can be exploratory in nature. Scientific information systems (of which ERIC is an example) are primarily designed for individuals involved in search behavior, but do not lend themselves to exploratory information seeking.[54] An interesting study, in light of the above, indicates that federally funded information programs are the information source least-used by educational practitioners.[55]

Although its applicability to education is questionable, an agricultural study has investigated the two-step flow of information hypothesis. The author posited that opinion leaders would seek and use more information from the mass media than those individuals they influenced, but the theory did not hold. Further, the findings suggested the conclusion that influential individuals sought and used more information from <u>all</u> sources than did non-influentials, but that they were not "gatekeepers" of information, since non-influentials did not obtain their information about new farming practices from the influentials.[56]

The thrust of Carl Rittenhouse's[57] study of the information needs of educational practitioners* is the inapplicability of most educational research

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*See Appendix C for Rittenhouse's compilation of the information most important to and most difficult to obtain by educational practitioners.

to the operational needs of practitioners. This irrelevancy may partially account for the tendency of practitioners to ignore such research, because of the nature of the problem-solving process. Rittenhouse writes:

> . . . it is often difficult for those concerned with change to specify information needs precisely or to locate, access, and obtain in suitable formats the information they may have determined to be necessary. The tendency, therefore, is for most individuals to make direct and informal contact with friends or others in the field whom they believe to be knowledgeable regarding the area of interest. Information searchers are particularly eager to obtain direct data on experience from districts similar to their own.[58]

This suggests two basic incompatibilities between the research community and the educational practitioner. The first is an apparent tendency of researchers to assume that the educational process corresponds to the rational, logical, step-by-step problem-solving methods of scientific research. The problem-solving process of educational practitioners is not analogous to this orderly process, for educational problem solving requires immediate decisions. These decisions often must be made on the basis of inadequate information if for no other reason than lack of time to gather more complete information.[59] In addition, it has been suggested that the concept of logical sequence is not necessarily applicable to the problem-solving process.[60]

The second incompatibility is the apparent lack of concern for, or lower prestige of, applied science. Practitioners may find it hard to understand the technical language and methods of pure research, and harder still to decide how it applies to their unique situations and problems. As Launor Carter points out:

> Traditionally, the researcher has taken the position that if he publishes his results in the formal scientific literature he has discharged his responsibility. From the evidence cited it would appear that the formal publication of new findings does not by any means assure that the results will be expeditiously translated into a useful development.[61]

The responsibility of the information producer to consider or anticipate the needs of prospective information users is an issue that cannot adequately be

treated here. Nevertheless, it suggests that the ethical implications of scientific research cannot totally be dismissed from a discussion of knowledge utilization.[62]

To summarize the discussion of research findings, then, it seems that the formal organization of the research community in the American educational system is a highly individualized, psycho-statistically and experimentally oriented enterprise which tends to value "pure" research. It has produced a voluminous body of information about the knowledge utilization process and other aspects of educational change, but has tended to ignore the aspect central to the present study, that is, communication. It has been found that educational research is not a significant information source for the educational practitioner, who tends to seek needed information through informal communication channels, in part because educational research is not operationally oriented and so seems irrelevant to him.

A more fundamental problem was suggested by Rittenhouse, i.e., that a person seeking information does not always know what information he needs, suggesting that a priori research is less useful than would be a posteriori production of research information upon request from practitioners. This is the thrust of a discussion by Carter which may adequately summarize the position. He says:

> If a major problem area needs attacking, then the solution should be sought by work within the context of the problem area itself rather than hoping that knowledge developed in basic research or in other applied areas will have great application to the particular problem needing solution. This conclusion tends to place basic scientific research in a less central position than is often done in discussing ways of solving major problems. Although basic research and scientific theory remain fundamental ingredients to solving problems, the knowledge derived from basic research tends to be too general to guide the way for the solution of specific contemporary problems.[63]

MEDIA THEORIES AND RESEARCH

Since the study for which this paper is being written is concerned in part with the role of the non-print media in knowledge utilization, media theories and research will briefly be considered here.

When considering the role of media in education, one should distinguish between the commercial mass media and media used as teaching devices in the classroom. Commercial mass media may be utilized as supplementary resources in addition to classroom activities or they may be used as direct-teaching devices in the classroom. Other media forms are of limited use for enrichment purposes but are useful for direct-teaching purposes.

The two types of media can be used for purposes other than direct or supplementary teaching aids, of course. They may be utilized specifically to provide information from the research community to educational practitioners; they may serve as information channels within the specific groups, such as students, practitioners, or educational researchers; they may serve as means of presenting information to the general public, through specialized media promotion, or through discussion of educational issues in the commercial mass media, or through educational television or other media forms.

Havelock outlines the variety of media which may be utilized in the educational system.[64] The variety includes written media, such as books, journals, magazines, newspaper, and papers; oral media, such as lectures, speeches, and symposia; television; films; radio and recordings; various mailing techniques; demonstrations; programmed instruction and teaching machines.

It is not assumed that the above list exhausts the potential media forms that might be used in the diffusion of educational information. The variety and uses of media listed, however, suggest that communication media are a ubiquitous, apparently valued, element in the daily educational process.

Theoretical discussion of communication media has concentrated on the mass communication media and has been, for the most part, within the empirical tradition of behavioral science,[65] reflecting dependence, generally, on the stimulus-response theories of that tradition and, specifically, on the mathematical Shannon-Weaver model of communication. This has encouraged what Charles Wright has referred to as the "hypodermic needle model" of mass communication.[66] This conception of the influence of communication media largely ignores the role of the audience in the consumption of media products, and has encouraged a research emphasis on effects of the media.

This dominant theoretical perspective has lost ground in recent years, as communication research has grown more sophisticated and as stimulus-response theories have lost validity in the behavioral sciences. The perspective has been challenged by two alternatives. The first is technological determinism, represented by Harold A. Innis and Marshall McLuhan.[67]

The second alternative can be characterized, generally, as a shift to a user-oriented view of media use. This view found early expression in the two-step flow hypothesis, which recognized that relationships among audience members have some mitigating influence on media effects.[68] Additional support for the view came from the work of Carl Hovland and his associates at Yale.[69] The user-oriented approach reflects a basic evolution in behavioral science theory from stimulus-response theories to social interaction and social psychological points of view.

Theoretical discussions of media use in education reflect the trend toward a user-oriented perspective and away from a stimulus-response emphasis on media effects. As Truman Pierce suggested:

> Available information on the character of current educational change and how this change takes place indicates that media have played no role of importance. This need not be interpreted to mean that no important role exists for media. It does mean that any such role remains to be developed.[70]

Frank G. Jennings argues that, in the hands of a competent teacher, media in the classroom can enrich the educational process, but that, in the hands of an incompetent or lazy teacher, media may be neutral or detrimental to learning.[71] On the more pervasive level of media in the environment--an environment which includes the educational system--Jennings feels that the mass media can enrich and stimulate learning both by school children and adults.[72]

Havelock's review of research on uses of media in the knowledge utilization process presents two basic conclusions: that one-way media are effective means of informing mass audiences about an innovation, but that, for the most part, two-way transmissions are required if adoption of any given innovation requires alterations in attitudes or behavior.[73]

The most significant conclusion about the role of media in the knowledge utilization process would seem to be that media per se do not improve or increase utilization of information. It has been suggested that the usefulness of any medium in the classroom is determined more by the teacher's attitude toward it than by any intrinsic merit of that mode of conveying information.[74] If the teacher is sympathetic to use of such a device as programmed instruction, for instance, and if the students are motivated, the device may improve the efficiency of information absorption,[75] but, as Havelock writes:

> The propensity and ability of the classroom teacher to consciously or unconsciously sabotage a threat to her long-standing role as "knowledge conveyor" and, hence, her perceived competence as a teacher is now a widely recognized problem.[76]

Just as the effectiveness of media in the classroom is itself "mediated" by the manipulations of the user, so too does commercial media use seem to be predicated on some criterion other than intrinsic merit of the medium. Individuals who are heavy users of any one medium seem to be more enthusiastic users of all other media as well,[77] indicating that the media will be used most by those who have a propensity to use the media most.

Concerning the present role of mass media in knowledge utilization, there is some evidence that the media are not reliable as information sources even to those people who have a propensity to use them. William Paisley, focusing on mass media coverage of behavioral science information, found research support for the proposition that very little information--often less than one per cent of the information generated by any given scientific event or discovery--found its way to the general public through the mass media.[78]

To summarize, theoretical discussions of and research on media use range from stimulus-response emphasis on effects of media, through the social psychological and interactional emphasis on the user of media and the relationships between and among users and producers, to technological determinism. Research can be cited to support various positions, of course, but it is emphasized here that some support exists for the proposition that users themselves determine how effective the various media will be for them, depending on their individual, perceived needs.

THEORETICAL CONTEXT OF PRESENT STUDY

The preceding discussion has been an attempt to touch on theoretical assertions and research findings that might be useful for conceiving of the knowledge utilization process from a communicational perspective.[79] The purpose of this concluding section is twofold: first, to present three aspects of the knowledge utilization process which the writer considers basic to understanding that process; second, to place the communicational perspective of the NCEC study within the context of existing theories of knowledge utilization.

The first aspect is the essentially insoluble conflict which exists between the producer and the user of information and which renders impossible the creation of a totally efficient information system. The conflict arises because empirical

scientific information per se tends to be irrelevant to the layman. At the same time, the producers or the information, who define the content of any information system, have a vested interest in consumption of that information by laymen (who, in the field of educational research, include teachers). The concern of the information producers is thus the effectiveness of the system, a concept which tends to overlook the information needs of the users of the system.

Concern with effectiveness encourages emphasis on efficient engineering of information dissemination and retrieval, with a consequent emphasis on techniques and technologies and a growing divergence between the functions of the system and the needs of its target audience.

Jürgen Habermas describes this conflict between scientists and laymen. His comment may suggest why the role of communication technology is considered central by those concerned with utilization of scientific information. Habermas said:

> Information provided by the strictly empirical sciences can be incorporated in the social life-world only through its technical utilization, as technological knowledge, serving the expansion of our power of technical control. Thus, such information is no on the same level as the action-orienting self-understanding of social groups. Hence, without mediation, the information content of the sciences cannot be relevant to . . . practical knowledge. . . . It can only attain significance through the detour marked by the practical results of technical progress.[80]

The second aspect is the private nature of information utilization. That an individual might decide to use some piece of information implies that he wishes to use it for some purpose. That he finds it useful implies that he has perceived some situation in his environment that he thinks will satisfactorily be altered through application of that information. This indicates that, as Richard LaPiere suggests, "utilization" is essentially a unique mental construct.[81] By virtue of the private nature of this process, it must occur in the form of specific solutions to specific problems[82] as perceived by unique individuals. The uniqueness, specificity and privacy of the process render doubtful the assumption

that a formal information system can provide on an a priori basis the information individuals will need to solve their changing problems.

The third aspect relates to the two already discussed, for it is the paradoxical supposition that innovation or change can be fostered through use of expert guidance, such as that available through scientific information systems. Experts are least likely to see the need for unique approaches to problems, for they have been socialized into a system in which they become more expert as they become more committed and conformist to the existing organization. Thus, the information produced by experts will tend to perpetuate the existing structure and will prove that much more irrelevant to the creative or competent inquirer. LaPiere says of this problem:

> . . . the more skilled and informed an individual is in the symbols of a given subject, whether it be theology or penology, electronics or embryology, the more habituated he is to the established ways of thinking of that field and the more inhibited he is from manipulating those symbols in a random, trial-and-error way. This is the reason why highly trained and recognized experts in any field of endeavor rarely innovate in that field, . . .
>
> It is also in part the reason why the innovative process cannot be organized and why innovators cannot be deliberately produced by educational or other institutions, why a school of innovation or an institute for the production of innovators cannot exist.[83]

Discussion of these three aspects may suggest the theoretical context of a communicational perspective on knowledge utilization. To refer to Havelock's categories, the position is basically the psychological problem-solver approach. This emphasis on the information user can be found in Lee Thayer's statement:

> "Knowledge" does not inhere in data; nor does meaning or significance or relevance. Knowledge is a human achievement. Data can be stored. But it cannot be used as a precise and universal catalyst, as if for immunization. Any one who would "use" the accumulated philosophical or theoretical statements of any discipline must first enable himself to do so; he must learn how to give form and significance and relevance to the statements of others. No statement of another, whether "scientific" or not, is self-evident.[84]

Several implications significant for analyzing the knowledge utilization process can be drawn from this statement. An incomplete list might include the

following: (1) that the user, or problem-solver, is of prime importance in any discussion of knowledge utilization;[85] (2) that knowledge is different from information;[86] (3) that utilization of information is not automatically a good action, that, in fact, we can never fully know the consequences of such an action and thus can never fully know whether the utilization was beneficial or detrimental for our purposes.[87]

From a communicational perspective, the role of media in the knowledge utilization process is de-emphasized, for the inquiring individual will seek needed information wherever he can and create needed information if he must. The knowledge "user" must discover information sources which are relevant for him. This would suggest a decreased concern with technology for its own sake or for the sake of increased efficiency of information dissemination.[88]

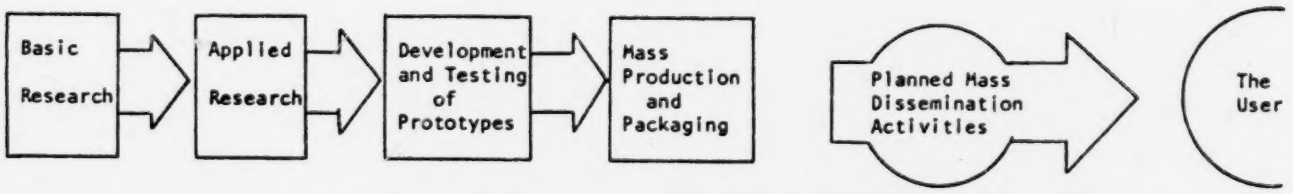
Theories and research can be found to support varying perspectives on the knowledge utilization process. With this in mind, the final conclusion of this review would simply be that the communicational perspective of the present study finds a fair amount of theoretical and research support in the extant literature on knowledge utilization in education.

APPENDIX A

Four Models of the Knowledge Utilization Process

Model 1

The Research, Development and Diffusion Perspective



Major Points Stressed: Rational Process
Planning Necessary
Division of Labor
High investment pays off in quality, quantity, long term benefit, and capacity to reach mass audience.

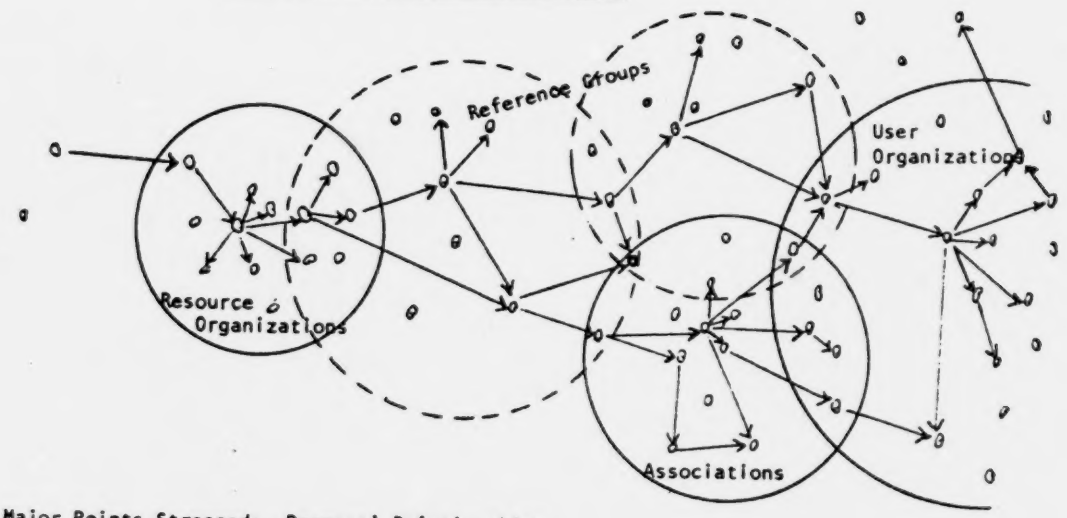
Spokesmen: Henry M. Brickell, David Clark, Egon Guba

Prototypes: Industrial R&D, U.S. Agricultural Research and Extension System

Source: Ronald G. Havelock, Planning for Innovation Through Dissemination and Utilization of Knowledge (Ann Arbor, Michigan: Center for Research on Utilization of Scientific Knowledge, Institute for Social Research, University of Michigan, second printing, 1971), page II-6.

Model 2

The Social Interaction Perspective



Major Points Stressed: Personal Relationships
Group Memberships and Identifications
Social Structure - Power and Influence Structures
Proximity, Cosmopoliteness
Opinion Leadership Structure

Spokesmen: Everett Rogers, James Coleman, Elihu Katz, Herbert Menzel, Richard Carlson, Paul Mort

Prototypes: Diffusion of innovations in farm practices, spread of new drugs among physicians.

Source: Ronald G. Havelock, Planning for Innovation Through Dissemination and Utilization of Knowledge (Ann Arbor, Michigan: Center for Research on Utilization of Scientific Knowledge, Institute for Social Research, University of Michigan, second printing, 1971), page II-8.

Key:
- Individuals in the social system.
- Flow of new knowledge.
- Formal organizational structures
- Informal structures.

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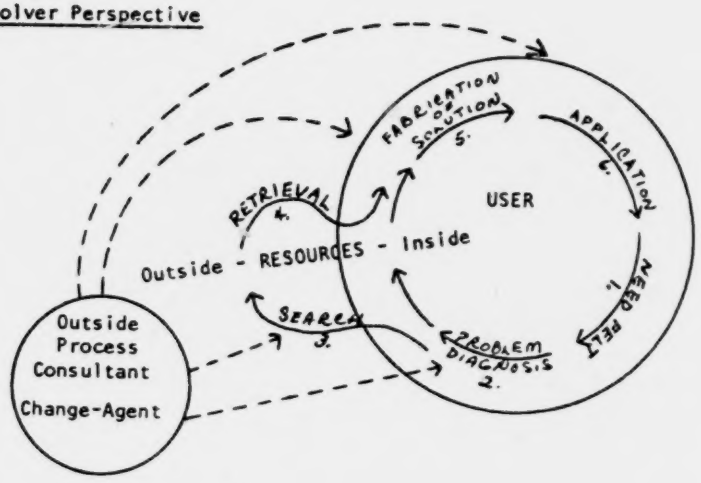
Model 3

The Problem-Solver Perspective



Major Points Stressed: The User's Need is the Paramount Consideration
Diagnosis is Part of the Process
The Outsider is a Catalyst Consultant or Collaborator but the User must find the Solution Himself or See it as His Own
Internal Resources should be fully Utilized
Self-initiated Change has the Firmest Motivational Basis and the Best Prospects for Long-Term Maintenance

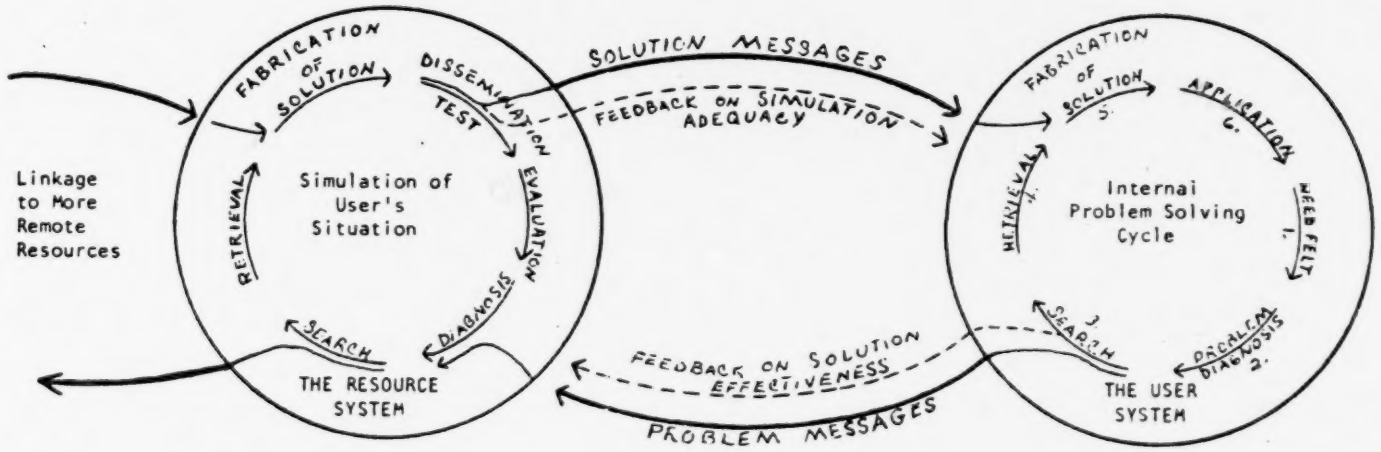
Spokesmen: Goodwin Watson, Ronald Lippitt, Herbert Thelen, Matthew Miles, Charles Jung

Prototypes: Organizational self-renewal, mental health consultation.

Source: Ronald G. Havelock, Planning for Innovation Through Dissemination and Utilization of Knowledge (Ann Arbor, Michigan: Center for Research on Utilization of Scientific Knowledge, Institute for Social Research, University of Michigan, second printing, 1971), page 11-12.

Model 4

The Linkage Process



From the Linkage Perspective:

1. Resource system must recapitulate or adequately simulate the user's problem-solving process.
2. The user must be able to understand (and simulate) the research, development, and evaluation processes employed by the resource system in the fabrication of solutions.
3. Resource and user must provide reciprocal feedback.
4. Successful linkage experiences build channels for efficient dissemination.

Source: Ronald G. Havelock, Planning for Innovation Through Dissemination and Utilization of Knowledge (Ann Arbor, Michigan: Center for Research on Utilization of Scientific Knowledge, Institute for Social Research, University of Michigan, second printing, 1971), page 11-16.

APPENDIX B

General Conclusions Drawn from Research

Into Knowledge Utilization

Source: Richard S. Farr, and Suzanne Pingree, Research Utilization: An Annotated Bibliography (Stanford: ERIC Clearinghouse on Educational Media and Technology, Stanford University, nd), pages 11-13.

1. In the adoption of new ideas or technologies, there are distinct stages through which an individual passes.
2. Different media have differential effectiveness in these stages: the mass media being most effective in the early stages as an individual becomes aware of a new idea and the interpersonal channels becoming increasingly important as the individual moves on into the later stages of adoption.
3. There is a two-step flow of communication from the mass media to the individual with gatekeepers or opinion leaders acting as intermediaries in this flow.
4. Opinion leaders are younger, enjoy higher social status, make greater use of cosmopolite, impersonal sources of information than those whom they influence.
5. The mass media are ineffective in changing attitudes or promoting new practices, except among a self-selected audience that is already predisposed to change.
6. The mass media are ineffective in raising knowledge levels of the entire population; the self-selected minority that "tunes in" to informational content is already above average in their knowledge. Low knowledge individuals targeted for the message are likely to "tune out."
7. The unit of adoption, that is whether or not a new idea can be adopted by a single individual alone or whether he needs the cooperation of others, determines the speed and ease with which a new idea is adopted.
8. The nature of the new idea or technology is an important determinant of the speed and ease with which it is accepted: the less risky and expensive ones are adopted first.
9. The credibility--expertise and trustworthiness--of the source of information about a new idea or technology also affects the speed and ease with which it is adopted.

10. Resistance to change, and even resistance to information itself, are often ego-defense mechanisms. Two factors, describable as "cognitive balance" and "conservation of energy" (or the "principle of least effort"), have the effect of blocking change.

11. The economic or game theory model of decision-making does not fit the data on adoption of new practices. The concept of "subjective utility" has to be defined very idiosyncratically to cover discrepancies between objective utility and actual choice.

12. There is a deep, vertical audience for educational information with at least four identifiable audiences--researchers, administrators, teachers, and the general public.

13. Education is unique in that there is no effective way by which the environment can be allowed to screen information. Other occupations in which individuals are busy and occupied with the press of other considerations allow the environment to screen the mass of available information on incoming channels. Education offers no such screening.

14. Peers, principals, and institutions within the educational system are perceived as the primary barriers to educational change by teachers.

15. Visibility of results or feedback--information on how a newly instituted change is working--are important factors in the continued trial of an innovation and further innovation.

APPENDIX C

Information Needs as Perceived by

Educational Practitioners

INFORMATION ITEMS REGARDED AS MOST IMPORTANT
AND MOST DIFFICULT TO OBTAIN*

Educational Planning Area	Information Highest in "Importance"	Information Most "Difficult to Obtain"
Curriculum planning and development	Effectiveness of current curriculum	Validation of new curriculum before its adoption
Adopting new methods of instruction	Requisite teaching and administrative skills	Time and effort required for teacher retraining
Evaluating the educational program	Identifying objectives in measurable terms	Identifying objectives in measurable terms
Planning new buildings	New directions in which education is moving	Opportunities for research studies
Appraising teacher or administrator effectiveness	Criteria for an effective appraisal system	Comparability of job assignments for purposes of appraising differences in effectiveness
Grouping, promotion and grading practices	Effects on students with respect to maturation, achievment, fast learners	Later academic success of students exposed to innovative methods of grading or grouping

Source: Carl H. Rittenhouse, Innovation Problems and Information Needs of Educational Practitioners (Menlo Park, California: Stanford Research Institute, 1970), page 7.

FOOTNOTES

1. Ronald G. Havelock, Planning for Innovation Through Dissemination and Utilization of Knowledge, 2nd Printing (Ann Arbor: Center for Research on Utilization of Scientific Knowledge, Institute for Social Research, University of Michigan, 1971).

2. Ibid., p. 1-1.

3. Paul Lazarsfeld and Sam D. Sieber, Organizing Educational Research (Englewood Cliffs, N.J.: Prentice-Hall, 1964).

   Sam D. Sieber and Paul Lazarsfeld, The Organization of Educational Research in the United States (Washington, D.C.: U.S. Office of Education, 1966).

4. Sam D. Sieber, "Institutional Setting," in The Role of Educational Research in Educational Change: The United States, ed. by Egon G. Guba (Washington, D.C.: U.S. Office of Education, 1967), p. 4.

5. Thomas D. Clemens, "Dissemination of Research Results," in Guba, The Role of Educational Research in Educational Change, pp. 41-42.

6. Sieber, "Institutional Setting," in Guba, The Role of Educational Research in Educational Change, p. 57.

7. Paul R. Mort and F. G. Cornell, American Schools in Transition (New York: Bureau of Publications, Teachers College, Columbia University, 1941).

   Paul R. Mort and O. F. Furno, Theory and Synthesis of a Sequential Simplex (New York: Institute of Administrative Research, Teachers College, Columbia University, 1960).

   Paul R. Mort, W. S. Vincent, and C. A. Newell, The Growing Edge, revised and re-issued (New York: Metropolitan School Study Council, 1945, 1953).

8. Paul R. Mort, "Studies in Educational Innovation from the Institute of Administrative Research: An Overview," in Innovation in Education, ed. by Matthew B. Miles (New York: Teachers College, Columbia University, 1964), p. 324.

9. Havelock, Planning for Innovation, p. 10-27.

10. Mort, "Studies in Educational Innovation," in Miles, Innovation in Education, p. 326.

11. Richard O. Carlson, Adoption of Educational Innovations (Eugene: Center for the Advanced Study of Educational Administration, University of Oregon, 1965).

12. Richard O. Carlson, "School Superintendents and Adoption of Modern Math: A Social Structure Profile," in Miles, Innovation in Education, p. 329.

13. The unique aspects of the public educational system are: ". . . vulnerability to the social environment; the professional self-image and associated values of educational personnel; the diffuseness of educational goals; and the need for coordination and control of the primary clientele as well as of the employees of the system." Sam D. Sieber, "Organizational Influences on

Innovative Roles," in Knowledge Production and Utilization in Educational Administration, ed. by Terry L. Eidell and Joanne M. Kitchel (Columbua, Ohio, and Eugene, Oregon: published jointly by University Council for Educational Administration, University of Oregon, 1968), p. 122.

14. See Charles Frankel, "Unphilosophical Pragmatism," chapter X of his book, The Love of Anxiety and Other Essays, Delta (New York: Dell Publishing Co., Inc., 1965), pp. 136-147.

15. Havelock, Planning for Innovation, p. 11-5.

16. Henry M. Brickell, Organizing New York State for Educational Change (Albany, N.Y.: New York State Education Department, 1961).

17. Henry M. Brickell, "State Organization for Educational Change: A Case Study and a Proposal," in Miles, Innovation in Education, p. 498.

18. Ibid.

19. Ibid., p. 499.

20. Ibid., p. 503.

21. Egon G. Guba, editor, The Role of Educational Research in Educational Change: The United States (Washington, D.C.: U.S. Office of Education, 1967).

22. Egon G. Guba, "Development, Diffusion and Evaluation," in Eidell and Kitchel, Knowledge Production and Utilization, p. 42.

23. Ibid., pp. 44-51.

24. Havelock, Planning for Innovation, p. 11-7.

25. Everett M. Rogers, Diffusion of Innovations (New York: Free Press of Glencoe, 1962).

    Everett M. Rogers, with F. Floyd Shoemaker, Communication of Innovations: A Cross-Cultural Approach (New York: Free Press of Glencoe, 1969).

26. Everett M. Rogers, "Preface and Overview," in Research Implications for Educational Diffusion, ed. by Everett M. Rogers (East Lansing: Michigan State University and Michigan Department of Education, 1968), p. ix.

    That the nature of the discipline in question may determine to some extent the information needs and uses of its practitioners is a point made by Diana Crane in her review of the literature about information utilization. The logical extension of this point is that research from one discipline may not apply to information utilization process of another discipline. Diana Crane, "Information Needs and Uses," in Annual Review of Information Science and Technology, Vol. 6, edited by Carlos A. Cuadra (Chicago: Encyclopaedia Britannica, Inc., 1971), p. 4.

27. Everett M. Rogers and Nemi C. Jain, "Needed Research on Diffusion Within Educational Organizations," in Rogers, Research Implications, p. 66.

28. Ibid., p. 77.

29. Ibid., p. 83.

30. Havelock, Planning for Innovation, pp. 10-30, 31, 32, 33.

31. Carlson, "School Superintendents and Adoption of Modern Math," in Miles, Innovation in Education, p. 333.

32. Havelock, Planning for Innovation, p. 10-12.

33. Ibid., p. 11-11.

34. Ibid.

35. Ronald Lippitt, Jeanne Watson, and Bruce Westley, The Dynamics of Planned Change (New York: Harcourt, Brace and Company, Inc., 1958).

36. Matthew B. Miles, editor, Innovation in Education (New York: Teachers College, Columbia University, 1964).

37. Ronald Lippitt, "Roles and Processes in Curriculum Development and Change," in Strategy for Curriculum Change, ed. by Robert R. Leeper (Washington, D.C.: Association for Supervision and Curriculum Development, 1965), pp. 12-13.

38. Havelock, Planning for Innovation, pp. 10-57, 58.

39. Matthew B. Miles, "Educational Innovation: The Nature of the Problem," in Miles, Innovation in Education, p. 19.

40. Havelock, Planning for Innovation, p. 11-14.

42. Egon G. Guba and John J. Horvat, "Concluding Note," in Guba, The Role of Educational Research in Educational Change, p. 73.

43. Richard O. Carlson, "Summary and Critique of Educational Diffusion Research," in Rogers, Research Implications, p. 4.

44. Ibid., p. 5.

45. Ibid.

46. Ibid., pp. 11-12.

47. Ibid., p. 15.

48. Ibid., p. 22.

49. Ibid., p. 21.

50. Ibid., pp. 22-23.

51. Herbert F. Lionberger, Adoption of New Ideas and Practices: A Summary of the Research Dealing with the Acceptance of Technological Change in Agriculture with Implications for Facilitating Such Change (Ames: Iowa State University Press, 1960).

Carlson, Adoption of Educational Innovations.

Rogers, Diffusion of Innovations.

James S. Coleman, Elihu Katz, and Herbert Menzel, Medical Innovation: A Diffusion Study (New York: Bobbs-Merrill, 1966).

52. George M. Beal and Everett M. Rogers, "The Scientist as a Referent in the Communication of New Technology," Public Opinion Quarterly, 22 (1958), 555-563.

53. Roland J. Pellegrin, "An Analysis of Sources and Processes of Innovation in Education" (paper presented at the Conference on Educational Change, sponsored by the Demonstration Project for Gifted Youth and the U.S. Office of Education. Eugene: Center for the Advanced Study of Educational Administration, University of Oregon, 1966).

54. Kurt W. Back, "The Behavior of Scientists: Communication and Creativity," Sociological Inquiry, 32:1 (1962), 82-87.

55. M. H. Chorness, Carl H. Rittenhouse, and R. C. Heald, Decision Processes and Information Needs in Education: A Field Survey (Berkeley: Far West Laboratory for Educational Research and Development, 1968).

56. Ralph Mason, "Use of Information Sources by Influentials in the Adoption Process," Public Opinion Quarterly, 27 (1963), 455-466.

57. Carl H. Rittenhouse, Innovation Problems and Information Needs of Educational Practitioners (Menlo Park, California: Stanford Research Institute, 1970).

58. Ibid., p. 71.

59. Monahan makes this argument in discussing the decision process in administration. See page 34 of his article: William G. Monahan, "Some Limitations and Cautions in the Use of Quantitative Techniques in Decision-Making," Educational Technology, September, 1969, pp. 31-35.

Richard Schmuck writes of the educational administrator: "He is usually expected to take action on inadequate, unreliable, and often conflicting information. Unlike the researcher, his personal commitment involves neither the 'truth' nor explanation and understanding; rather he responds more to the opinions of others, to the immediate demands placed upon him, and to problem situations more immediately." "Social Psychological Factors in Knowledge Utilization as Applied to Educational Administration" (paper prepared for University Council for Educational Administration Development Seminar, Portland, Oregon, October 22-25, 1967. Eugene: Center for the Advanced Study of Educational Administration, University of Oregon, 1967). p. 18.

60. Launor F. Carter, "From Research to Development to Use" (paper presented at American Educational Research Association symposium, Chicago, Illinois, February 20-21, 1966. Santa Monica: System Development Corporation, 1966), p. 4.

61. Ibid., p. 24.

62. This is the position taken by Miles. He writes: ". . . university and college professors have conducted research to answer fundamental questions underlying the design of innovations, and in some cases have developed innovations as a result. The responsibility for dissemination of research findings, so as to bring about local awareness-interest, evaluation, and trial, has, however, been ordinarily assumed to belong to some other group. For example, it has often been remarked that local school personnel do not read research journals with great voracity--but the classical educational researcher continues to assume that his responsibility ends with the act of publication." Innovation in Education, p. 25.

63. Launor F. Carter, "Knowledge Production and Utilization in Contemporary Organizations," in Eidell and Kitchel, Knowledge Production and Utilization, p. 15.

64. Havelock, Planning for Innovation, pp. 9-1 - 9-41.

65. For discussion of this research tradition, see Denis McQuail, Towards a Sociology of Mass Communications (London: Collier-Macmillan Limited, 1969).

66. Charles R. Wright, Mass Communication: A Sociological Perspective (New York: Random House, 1959), p. 50.

67. Harold A. Innis, The Bias of Communication (Toronto: University of Toronto Press, 1951).

    Marshall McLuhan, Understanding Media: The Extensions of Man, Signet Book (New York: New American Library, 1964).

68. Elihu Katz and Paul F. Lazarsfeld, Personal Influence: The Part Played by People in the Flow of Mass Communications (Glencoe: Free Press, 1955).

    Elihu Katz, "The Two-Step Flow of Communication," Public Opinion Quarterly, 21 (1957), 61-68.

69. For example, see Carl I. Hovland, Irving L. Janis, and Harold H. Kelley, Communication and Persuasion (New Haven: Yale University Press, 1953).

70. Truman M. Pierce, "Educational Change and the Role of Media" (paper prepared for the Symposium on Identifying Techniques and Principles for Gaining Acceptance of Research Results of Use of Newer Media in Education, Lincoln, Nebraska, November 24-27, 1963), p. 15.

71. Frank G. Jennings, "Mass Media, Mass Mind, and Makeshift: Comments on Educational Innovation and the Public Weal," in Miles, Innovation in Education, pp. 563-585, see esp. 574.

72. This optimistic view of popular culture is opposed by critics such as Ernest van den Haag and Dwight MacDonald. A representative collection of pro and con arguments about popular culture can be found in Alan Casty, editor, Mass Media and Mass Man (New York: Holt, Rinehart and Winston, Inc., 1968).

73. Havelock, Planning for Innovation, p. 9-40.

74. Egon G. Guba and Clinton A. Synder, "Instructional Television and the Classroom Teacher," Audio-Visual Communication Review, 13 (1965), 5-26.

75. H. A. Schwartz and R. J. Haskell, "A Study of Computer-Assisted Instruction in Industrial Training," Journal of Applied Psychology, 50 (1966), 360-363.

76. Havelock, Planning for Innovation, p. 9-15.

77. Mason, "Use of Information Sources."

James W. Swinehart and Jack M. McLeod, "News About Science: Channels, Audiences, and Effects," Public Opinion Quarterly, 24 (1960), 583-589.

Wilbur Schramm, "Science and the Public Mind," in Studies of Innovation and of Communication to the Public: Studies in the Utilization of Behavioral Sciences, ed. by Elihu Katz et al. (Stanford: Institute for Communication Research, 1962), vol. 2, pp. 261-286.

Robert C. Davis, The Public Impact of Science in the Mass Media: A Report on a Nation-Wide Survey for the National Association of Science Writers (Ann Arbor: Institute for Social Research, University of Michigan, 1958).

78. William J. Paisley, The Flow of (Behavioral) Science Information: A Review of the Research Literature (Stanford: Institute for Communication Research, Stanford University, 1965), see esp. pp. v-19 - v-22.

79. For a statement of the communicational perspective, see Lee Thayer, "On Communication, Knowledge Utilization, and the Educational Enterprise" (Research Memorandum #5, NCEC Knowledge Utilization Study, Center for the Advanced Study of Communication, University of Iowa, Iowa City, November, 1971).

80. Jürgen Habermas, Toward a Rational Society, Beacon Paperback (Boston: Beacon Press, 1970), p. 52.

81. Richard T. LaPiere, Social Change (New York: McGraw-Hill Book Company, 1965), p. 107.

82. Ibid., p. 115.

83. Ibid., p. 119.

84. Thayer, "On Communication, Knowledge Utilization, and the Educational Enterprise," pp. 8-9.

85. This is supported by Paisley and Parker, who write: "An illogical personal reference system that always answers the queries of its creator is more effective, in our view, than a relentlessly logical universal reference system

that intimidates potential users by its complexity. From this perspective, a system cannot by evaluated without detailed consideration of the information needs and preferred search strategies of its intended users." William J. Paisley and Edwin B. Parker, "Information Retrieval as a Receiver-Controlled Communication System," in Proceedings of the Symposium on Education for Information Science, ed. by Laurence B. Heilprin, Barbara Markuson, and Frederick Goodman (Washington, D.C.: Spartan Books, 1965), p. 25.

86. Belth makes this distinction when he writes: "To educate, you see, is to confront the theoretical structuring which was the very form and screen of the messages which have been stored, and which we now seek to retrieve. For the messages themselves, the information which is the outcome of previous inquiry, are bound together into the meaning they contain on the basis of explanatory systems, purely theoretical postulations, which, unfortunately, do not get themselves stored along with the message." Marc Belth, "A Misplaced Analogy: A Rebuttal of the Proposed Relation Between Information Retrieval and Education," in Heilprin, Markuson and Goodman, Proceedings, p. 7.

87. LaPiere, pp. 66-67.

Schmuck, p. 26.

88. LaPiere's discussion of technology as an interdependent variable in the change process, rather than as an operational, self-contained unit, is applicable here. See chapter 8, "The Technological Variable," pp. 253-290.

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Project: NCEC Knowledge Utilization Study

Research Memorandum #8:

"U.S. Education: A Look at Social, Political, and Economic Constraints Accommodated by Democracy for the Teacher"

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Date: 15 January 1972

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> They, then, who knowingly withhold sustenance from a child, and he dies, are guilty of infanticide. And, by the same reasoning, they who refuse to enlighten the intellect of a rising generation, are guilty of degrading the human race! They who refuse to train up children in the way they should go, are training up incendiaries and madmen to destroy property and life, and to invade and pollute the sanctuaries of society.
>
> Horace Mann, 1846

Variations on Mann's theme have existed before and after his time, in countries other than his own as well. Those variations have been the subject matter for spirited debate during this country's educational history. Mann himself lived during what was perhaps the most significant period, for he and his contemporaries were experiencing the new problems of urbanization and industrialization, which in turn were strong influences in education. Urbanization and industrialization were felt even at the more personal levels: it was the first time that parents en mass had to deal with the fact that their children would be away from home for the better part of a day, attending public schools. To the farmer this spelled grave consequences, in many cases economic disaster; not only would his children no longer be counted on as a primary labor source, but, with the coming of urban centers and new alternative life styles, he could no longer depend on his children to perpetuate the family farm. Thirty-five years after Mann uttered the above words, the precedent for U.S. education was set, the structure and practices of which were to alter only slightly, if at all, even into the 1970's.[1]

"Urbanization" and "industrialization" are, granted, abstractions. Only when we look at the farmer of the period, or probe any other personal level, can we appreciate the radical way in which even the average citizen was viewing

the world in which he lived. But if "urbanization" and "industrialization" are abstractions, "education" is even more so. How does one find out what "education" is? He can look to Jefferson, Mann, or Dewey, or any other person whose name keeps popping up in education histories, and learn what they had to say about education. But does what they said have anything to do with the way the education enterprise is?

To posit an affirmative answer to this question is to pose a thesis with staggering odds against defense; for even a cursory scanning of these "great men" (as so many historians call them) reveals a deluge of disagreement regarding what education should be. To further compound the problems of such a thesis, one finds that those histories appealing to big names in education (incidently the approach common to the bulk of the literature) say something quite different from what the "authority" said.[2] It appears that to pursue a history of U.S. education with the authority-approach is not only to confuse the matter, but is implicitly to give power to these people, as if, somehow, they have all managed to get together spiritually with their collective hands molding the education enterprise; in this sense such big-name-educationalists are as much an abstraction as is "education," and searching for any link between them and the classroom teacher is skirting the problem.

That problem is this: that a history of anything is not the history only of political and philosophical leaders; nor is it the history only of events, usually the only other alternative approach indulged by most historians to date; rather the problem is the history of the anonymous mass, the common man, chiefly, who has lived with the problems of any given era in a down-to-earth, direct, operational day-to-day world of his own--like the farmer mentioned above.

The intent here is not to dismiss Dewey, Mann, etc., as insignificant. Certainly ideas have excited man. But oftentimes the teacher, if he is excited by ideas, has little time to contemplate Dewey when performing his daily activities before a class of thirty. This study aims not to take that rather idealistic approach of discussion through appeals to men and their philosophies of education. The intent is to accommodate an anonymous mass, in this case "teachers," through a less idealistic approach. That approach will be discussed shortly.

Aside from the element of "shouldness," the common denominator in the varied historic statements on education is that society has a vested interest in the educational enterprise. Such a view is not unique to American education; it has been held in countries "democratic" or not throughout the history of the world. In this country, stress upon the individual in terms of equal opportunity has been the stated cornerstone; but for a democracy to <u>be</u>, an educated populace is the stated requisite. Why this notion evolved is not our concern; nor is whether or not, given a truly educated populace (whatever that may be), substantive participation thereby produces intelligent decisions; nor is whether or not, given the opportunity, intelligent potential decisions are even taken into account by the government. The point is that the notion did evolve, that by 1852[3] compulsory attendance laws began appearing and found their place in most states during the latter quarter of the nineteenth century. So we find that, even though the individual has supposedly been in high regard in this country, he was not regarded enough to be entrusted with the responsibility for educating himself. Such has been the American character--that the young, whether they want it or not, <u>shall</u> acquire education, that with the young and with education lie the future of American democracy. The same could be said of other states as well (democratic or

otherwise), except that in the case of the United States, "the young" has meant all the young since 1900.

Much of the current literature, particularly that strong with "crisis rhetoric," screams that something is wrong with American education today. This study agrees that something is indeed wrong. But what is to be done? That same literature emphasizes the student and, by contrast, the teacher has received little mention. The teacher and student must deal each with the other; in the final analysis, that is what occurs, what must occur. How they deal with each other, most of the literature states (indeed, most administrators state!), rests with the teacher. Such a view is misleading. It implies that the teacher knows how to set up whatever a productive teacher-student relationship would be and that, even if he sees a way to do so, the teacher in fact has the freedom within the school system to set up his ideal teacher-student relationship.

The above discussion of democracy leaves us with a more than down-to-earth approach, an approach already rejected. To be more realistic, this study focuses on the teacher, and asserts that constraints exist for him. It further asserts that those constraints are brought into that teacher-student relationship with the teacher, and in fact help determine what that relationship is. This study will attempt to clarify those constraints.

That part of American democracy which claims education as the public's business, which declares that all the young be educated, and which holds the young and their education as the "hope for America," is seen not only as a background for those constraints, but for most of them the very source. In short, then, the thesis for this study is this: that practiced democracy, as opposed to the various ideal democracies, is historically a major source of social, political, and economic constraints for the teacher in the formal

U.S. education enterprise. Much of the historical literature speaks of the "great freedoms" which democracy provides for American education; such histories are at best naive in that they gloss over the work-a-day world of teachers, students, school boards, state boards of education, parents, etc. To be sure, freedom exists, but there are limits. This study considers those limits for the teacher and, where appropriate, the historical basis for those limits. The constraints which follow are not to be taken as an inclusive listing; they are what I consider only the major identifiable few which the education system not only allows for, but indeed has prescribed.

The Constraint of Sheer Numbers

The historic reason for the constraint of sheer numbers is obvious in light of the prior discussion. Again, and briefly, one need only observe that by 1900 nearly all states had laws requiring that all children attend schools. Even provisions for truance were established. What we had, then, was the result of democracy in action: the appearance of large numbers of children in schools with the consent of the voting.

Much talk today is of the so-called "teacher surplus." The emphasis is intriguing if one asks why the phrase is not instead "student surplus." The problem is not one of too many teachers, but of too many students in terms of the teacher-student relationship. For what kind of relationship must exist, particularly at the secondary level, if the teacher today has an average of five classes averaging thirty-plus students per class? In major urban areas the ratio is higher--forty-plus students per teacher. Sheer numbers alone is a strong determiner of what that relationship will be; the constraint forces the teacher to be more impersonal, more detached from his students because, above anything else, the job before him is an engineering problem: moving numbers of students-as-objects through his classes. Quality is subordinate

to quantity, for the teacher cannot afford to keep many students at his grade level for fear of making his numbers problem worse; there are more students coming up, and it appears they will always keep coming, and he must get rid of those he has to make room for next year's crop. Grading, perhaps itself a constraint, cannot escape the quality of artificiality, (due in part to the constraint of sheer numbers). To some degree, the teacher can develop a one-to-one relationship with a select few, but the numbers make such cases rare exceptions instead of common practice.

No law exists requiring individuals to attend colleges or universities. That fact does not provide the teacher in higher education the luxury of escape from the constraint of sheer numbers. Particularly during the last two decades, going to college has meant a better-paying job; though that notion today seems a myth, there was at one time that economic reason for attending college. Attendance was higher than ever. The utterance, "A high school education isn't enough," carried not only that economic message but, within many groups, a message of status as well. We could continue endlessly, pointing to reasons ranging from the demands of technology to the evasion of the draft; but it is clear that an individual attending a college or university found himself there not solely as a result of his desire to grow intellectually.

Laws have required that everyone go to primary and secondary school. But no law has been passed to keep the student-teacher ratio at whatever the acceptable ratio might be. The obvious reason for such a nonoccurrence is an economic one: school districts and their supporting tax-payers do not have the money to hire three to four times the current number of teachers. Perhaps because the reason is so obvious, the lack of funds for that purpose is not further pursued. Maybe the pursuit should begin; at the risk

of a cliché, a reordering of financial priorities at the federal level could make the hiring of more teachers possible. Another way to eradicate the constraint of sheer numbers would be simply to remove the majority of students from schools as they are presently organized. But doing that would necessitate a fundamental change in America's brand of democracy, a prospect as bleak as spending more money for teacher salaries. If we must abandon these two alternatives, then, what can be done to relax the constraint? Many school districts have adopted the use of teaching machines, closed-circuit television, and other assorted technics, ostensibly to relieve the numbers burden. What has this approach accomplished?

Not much. A distinction between training and education should be made. If the task of teachers be training, the constraint of sheer numbers really does not exist; only one sergeant is needed to train a platoon, only one trainer (assisted by technics and a behavior modification approach, in the long range far cheaper than salary pay-out) is needed to train a class of fifty trainees at TWA--the examples are endless. Similar mass training techniques have been employed by school districts; they work well if training is the task. But the constraint remains even in those districts. This suggests that, even if training is a job of the teacher, it is not his only job. He is engaged in education as well (again, whatever that may be); whatever education is, it is clear that dialogue and "humanness" are necessary--sheer numbers suppresses both.

The teacher cannot help talking to a class instead of talking with John, Mary, Dick, and Jane. Only in the latter situation, so many educationalists have said, can both the teacher and student "grow" in the formal education system. The teacher has, ultimately, the action (and economic inaction) of practiced American democracy to thank for this, the most visible constraint of all.

The Constraint of Standardized Materials

The constraint of sheer numbers is in part a cause for the existence of the constraint of standardized materials. When the teacher has large numbers of students before him, standardization is inevitable.

A second source of this constraint is due in part to the influence of book publishers in this country:

> When they (textbook publishers) promote an instructional change, a great wave of influence sweeps over the schools. On the other hand, once they begin to market a given product, they serve as powerful inhibitors of further change, because they seek volume distribution and repeated sales of the same product. One reason for their power is that they innovate early, before the majority of schools have begun to change... Because they draw their instructional materials from a common commercial pool, the slower-moving schools are probably pulled forward, while the faster-moving schools are probably held back. One result is a nation-wide tendency toward unification of curriculum content and instructional methods.[4]

Given the massness of our "democratic" public school system, there is little hope of insulating schools from the impact of these book publishers.

Thirdly, the manner in which school boards operate is another source of the constraint of standardized materials. The school board is mainly concerned with budgets; the power to purchase teaching materials ultimately rests with the local school board. The school board will be discussed at greater length below; suffice it to say here that board members strive for expediency (whether they are expedient is another matter). The less time spent on any matter the better. The quickest way to purchase teaching materials is to purchase them at once for the entire district; thus we find that most school boards have in their rules a provision requiring that the same texts be used for each grade in each school within the board's jurisdiction.

Each of the three reasons for the constraint of standardized materials is easily seen as part of operational democracy. The first has already been

discussed under the constraint of sheer numbers. The second is the result in part of our alleged "free enterprise" system, an economic-democratic tradition, even though the nature of that "free" system allows for consolidated economic power as strong an effect in education as car manufacturers are for the consumer. The third is a result of "democratic" election and the bureaucratic-hierarchical tradition firmly fixed in education by 1880. That non-teachers purchase teaching materials is purely in keeping with the American brand of democracy and education.

How is the teacher constrained by standardized materials? One would think standardization allows the teacher to deal with the constraint of sheer numbers. And, if standardized materials are there for the teacher to use, does not the teacher have the option of <u>not</u> using them? Other constraints below will in part answer those questions. But this much can be said. Particularly in urban centers, we find that the standard eighth grade English grammar texts, for example, are relatively unusable in the ghetto school; there eighth grade English students average a fourth-fifth grade reading level. Further, we find that, in an upper-middle-class all-white school of the same school district, the same eighth grade English text is below the reading level of eighth graders. Standard materials force nearly all students to work (or not work) on a level other than their own. In the ghetto school, the standard texts are more often than not the only materials available to the teacher; any "supplementary" materials available are generally standard texts discarded for general use by the school board in years past. In the all-white school we find a separate audio-visual (A-V) department available to the teacher, while the teacher in the ghetto school is often quite lucky to remain in constant supply of chalk. Teacher-training does not usually take into account use of A-V equipment; so the teacher in the all-white school, although he may avail

himself of A-V services, has little choice but to rely heavily on the standardized materials provided. The constraint here for the teacher "teaching" students with low reading levels is clear. That the constraint exists for the teacher with "average" or "advanced" students is not so clear. But it is there nonetheless: school boards like to see how their students rank nationally via standardized tests. That fact alone is enough to force the teacher to use the standardized materials available, for those materials are often the only ones available which are fairly comprehensive. Finally, use of standardized materials does not help alleviate the constraint of sheer numbers, but reinforces that constraint. The constraint of standardized materials helps keep the constraint of sheer numbers alive, well, and constant.

The Constraint of State Boards of Education

State boards of education, by whatever name called, perform activities which also constrain the teacher. It is this state board that decides what the teacher must teach within the school year; such "guidelines," rather extensiv sometimes become "specific-ied" by local boards. Generally, though, the local school board serves as enforcer (in practice) of the state-determined curriculum. The state boards of education derive their power from state laws enacted by state legislators, themselves voted into power by the people of the state. Thus the state board can do what it does as a result of democracy in action, that curious state of affairs where education is everybody's business. The state board decides for the student what he needs as far as curriculum is concern and, in so deciding, decides what the teacher must teach.

The local board, as stated, enforces those "guidelines." One is appalled at what constitutes enforcement. Usually, the following scenario is played.[5] The local board will have, for example, an English department. This local board

English department sends out its administrative "law men," usually older individuals who, if they have taught, ceased doing so several years ago. The school board must have something it can see as a sign of the "guidelines" being carried out. So the board's English department has a rule which states something like: "All seventh grade pupils must write one paragraph per month. Each paragraph will have an outline (in pencil), rough draft (in pencil), a reader's copy (in those schools employing paper readers), and final copy (double-spaced in ink). Each paragraph, with all steps completed, shall then be stapled together and put in a file folder bearing the pupil's name." The paper work involved here is in itself a constraint. Then, under the guise of "pupil progress," the head "law officer" for the board's English department (or his second-in-command) visits all English teachers, particularly new teachers, about once a month. He frowns upon paragraphs without a topic common to all students (reinforcing the practice of standardization), looks to see that all "headings" are in the upper right-hand corner, and makes approving or disapproving comments about pupil penmanship. He suggests, while looking at the local board's syllabus for seventh grade English (resembling the state "guidelines"), that for the next paragraph the teacher work on topic sentences. If the teacher happens to be in the ghetto, he finds his remark, "But my students can't even write their own names" met with, at best, "Why don't you have them work on that, too."

Although the above scenario is not played in exactly the same way in all districts, enforcement in some manner of state board of education curriculum criteria is by nearly all. Often the teacher finds ways to get around "established practices" of the sort. But the fact that he must deal with them is testimony that the actions of state boards of education constitute a constraint--a constraint which, for the most part, rarely meets the needs of the teacher or his students.

The Constraint of Local School Boards

The local school board has already been mentioned. No repetition is intended, but by now it should be obvious that each constraint is interrelated with the others.

The local board is responsible for the budget in all respects (curriculum needs, plant facilities, salaries, etc.); hiring and releasing of teachers, principals, janitors, bus drivers; granting tenure; and contracting for school supplies and food purchases. When it comes down to the essentials, the local board only acts on matters of direct concern to the board members: "finances or public relations between the school and the community."[6]

Who those members are is important. By 1900 nearly all states provided for the existence of school districts in their constitutions.[7] Membership was left up to the townships. Vidich holds that school boards were dominated by rural interests. That still holds, except in urban areas during the past two decades where business interests have dominated. This is rather a minor distinction, though, since farming is now big business; the major point is that, whether dominated by farmers or businessmen (either or both hold and have held exclusive membership on local boards), board members are primarily interested in low taxes. Only what is absolutely essential in the eyes of the board is what shall be proposed to the tax-payers at large.

Why board membership is what it is makes for interesting contemplation; only rarely do we find someone other than a farmer or businessman on any school board. But, for this study, that it is is enough. Again, we find that education is the business of non-educators; further, ultimate financial control for the education enterprise is in the hands of non-educators, non-educators who represent the conservative, well-off members of the community.

What does this do for the teacher? His job, in effect, is reduced to finances. What a teacher may see as necessary more often than not is seen as unnecessary by board members. In terms of action, the board really does not worry about teachers or students; only when a teacher or student becomes the center of community controversy does the board take notice--and, even then, only notice to expedite the situation and get back to the status quo. If certain teaching materials are viewed as necessary by the teacher, he may as well in most cases contemplate purchasing them himself; financially, he cannot afford it, but he'd do better so contemplating than gaining access to the board's attention.

Given the powers of the board and the ways members have consistently acted, the constraints for the teacher here are clear. To state the problem another way: when it comes to matters of education in terms of the teacher-student relationship, it is the board's inaction, as much as its action, that constrains the teacher.

The Constraint of Community Social Pressure

Strongly related to the constraint of local school boards is the constraint of community social pressure. Particularly in rural areas, not only is the teacher's teaching everybody's business, but the teacher's personal life as well. Whether or not he attends church, frequents bars, etc., are social realities for the teacher. The community sits in moral judgment, and, if a public issue concerning the teacher occurs, the local board acts--usually in favor of the community. When this happens, and the ACLU is rich with case examples, the school board, too, sits in moral judgment.

This is a curious phenomenon. Not even the private lives of politicians endure as much scrutiny as do teachers'. Maybe this is so because the politician is not used as an example for children to the extent the teacher is. There seems

to be a strong tradition, dating back to the colonial period, that the teacher's job is in part that of setting an example.

Image, appearance, moral character, etc. (all parts of this constraint) are not expected only of the rural teacher. To overstate the obvious, the community exists primarily of parents, and parents have children, and all children belong to the school's teachers five days a week. What a student tells his parents about his teacher can be and has been damaging to the teacher. While teachers complain of their role as surrogate parents, parents claim their expertise on teaching. And it is more often the parent, once he's produced a public issue, whose power is greater than the teacher's. That fact the teacher cannot ignore.

The Constraint of Peer Social Pressure

Just as the teacher deals with community social pressure, he also faces the constraint of peer social pressure. Like nearly anyone else in nearly any other job, teachers become set in their ways. That in itself may be a constraint. The new teacher, who may have, in spite of his own education, many new potentially "good" ideas, finds being accepted by the "old guard" one of his major tasks; his new ideas fall beneath the high priority level. The following statement by Breed states the case clearly. His study was concerned with social control in the newsroom. For "newsman's" substitute "teacher's," for "newsroom" substitute "school building," and for "readers" substitute "students."

> The newsman's source of rewards is located not among the readers, who are manifestly his clients, but among his colleagues and superiors. Instead of adhering to societal and professional ideals, he redefines his values to the more pragmatic level of the newsroom group. He thereby gains not only status rewards, but also acceptance in a solidary group engaged in interesting, varied, and sometimes important work. Thus the cultural patterns of the newsroom produce results insufficient for wider democratic needs.[8]

Not to make waves becomes important, because to do so is to risk not being socially admitted to the "club."

In part due to the constraint of peer social pressure, the new teacher strives to cover what the syllabus dictates, because how his students perform in the next grade will become a strong factor in his peers' (more often a member of the "old guard") judgments. He sees the older teachers using standard texts; in light of this constraint, the new teacher uses them, too. Looking to a member of the "old guard" as a model is common. In many cases, that may be the positive thing to do. But, in terms of improving the student-teacher relationship, it is a constraint for the new teacher. To be sure, though the social control is largely covert, socialization is effected to the point of determining the new teacher's teaching methods, as has the same process affected the model teacher.

In a direct sense, the student as well as the teacher is the victim of the constraint of peer social pressure, a constraint which helps keep the American democratic school system alive.

The Constraint of Teacher Education

We come now to what is the final major constraint this study considers. If one were to look for an enterprise imbued with conservative tradition, he need look no further than most education departments on nearly any college or university campus. That teacher education even be considered a constraint would offend most education "professors," and in fact has. Silberman provides a case in point:

> In discussions growing out of the search for a new dean, the president of a large midwestern state university suggested the desirability of a closer association between the college of education and the university's college of arts and sciences. Though couched in the most tentative and gingerly fashion, the mere suggestion touched off a storm. Members of the education faculty were united in opposition....[9]

Silberman also quotes Conant's book, The Education of American Teachers: "There

is too much resentment (on the part of college education department faculty) of outside criticism, and too little effort toward vigorous internal criticism.... the establishment's rigidity (is) frightening."[10]

Education departments are fond of mentioning the teacher-student relationship, and then devoting the bulk of their curriculum to measurement-evaluation methods (with talk of bell-shaped curves and test scores); child development (saying really nothing more than children have problems when they grow, that the prenatal period is important); survey psychology courses (where one might learn what a psychotic is, but not how to handle him); a guidance survey course (saying rally nothing more than if a child has a problem, refer him to the guidance counselor--assuming the teacher can recognize the problem and that the guidance counselor will solve the problem); and a lot of talk about what it means to be a professional (if, in fact, a teacher ever is one).

In short, teacher education does little to educate potential teachers to become teachers. When the education major graduates, his degree amounts to nothing more than a collection of courses on a transcript that comply with the minimum state certification standards.

Perhaps in desperation, but certainly in defensive anger, the education faculty would reply, "But what about student-teaching? Here the education major gets into the real-world situation with the opportunity for constructive criticism!" My reply is, "Wrong, on both counts." The situation is anything but real-world, for one important factor is absent: the student-teacher's deciding what he is going to do. More often than not, his "cooperating teacher," the resident teacher, does that deciding for him. The student-teacher finds himself little more than a robot trying to assume the personality and methods of his "cooperating teacher." Secondly, criticism from the "cooperating teacher" is not constructive to the student-teacher in any substantive sense; the criticism

is generally reducible to, "do it the way I do." Further, how can any criticism be constructive if the student-teacher sees his "cooperating teacher" at best an hour per teaching day? When a teacher has a student-teacher, it is generally vacation time from the classes. And certainly one cannot expect criticism from the college's representative to be constructive when the student-teacher sees him at best once every two weeks for, if he's lucky, one hour. At those rare moments the "constructive criticism" has to do with the superficial: someone's gum-chewing, the student-teacher's appearance, his voice projection, whether or not he used hand gesture, or opened the windows. The closest comment he ever receives about education concerns discipline within the class, and even that is superficial. Perhaps the only productive thing a student-teacher may gain is to reach the decision that teaching is not for him. But usually it is too late for even that, because he has already invested more than three years in that education major. So he endures.

If one part of teacher education programs as they presently exist is potentially beneficial to the student-teacher, student-teaching is it. But, unfortunately, "student-teaching" is a misnomer; "teacher-appearing" is more appropriate.

One could go on endlessly about the defects of teacher education; they are obvious, in fact, common knowledge. And since that knowledge is so common, one is amazed that teacher education programs at the majority of colleges and universities have not changed for over fifty years. One reason is that teachers in the field, the "old guard" alumni, tend not to press for changes. Somehow, they forget the idealistic "gripes" of their student-teaching days; and that is understandable. As noted earlier, teachers as much as anyone else become set in their ways. Being human, the thing to do is the easiest: what they have been doing in their classrooms for years. One could call this condition "apathy" when it comes

to in-the-field concern about teacher education; from looking into the teacher's day-to-day world, one is tempted to use instead the term "anomie."

There is a clearer reason for the lack of change in education departments. The college president, in the case earlier cited, could have overridden the objections of the education faculty; what stopped him from doing so was what he described as "the education establishment within the state, that is, the principals and superintendents,"[11] most of them graduates of the university. A college president does not like to see his student enrollment plunge. Those alumni hold the power to bring about just such an occurrence.

Conclusion and Prospects

Set forth have been what this writer views as the major constraints for the teacher. Certainly, there are others. At the outset the stated thesis was that operational democracy has been the source for those constraints. For most of the constraints discussed, the connection has been quite apparent; for others, the connection may have been vague. Nonetheless, an American democratic notion of education has evolved, traces of which are observable at various points in our history. For the most part, conducting such observations via the existing literature has been a process of inference. Only recently have histories of the sort necessary to understanding better the common man begun. The history of anything is in the main the history of the anonymous mass; most histories are of "great people" and what they said and/or events. Histories of that usual type serve only as indicators; what they indicate must be inferred.

This study has been more a suggested approach for histories-to-be-written than it is itself a history. The need for new historical approaches in education has already been perceived: recommended are those by Katz and Silberman, noted in the bibliography. Others are Welter's Popular Education and Democratic

Thought in America and Illich's Deschooling Society. Apart from those, and some few others, just about any education history will do for inference reading. Whether a definitive history of U.S. education can ever be written is debatable; but certainly the literature to date is far from definitive. Apart from the nineteenth century and beyond, the history of the formal U.S. education enterprise can be stated in one sentence: U.S. education began as a home enterprise, and by 1880 became an institutional, away-from-home public enterprise. Not much more than that need be stated. Why the transition occurred can be answered by going back no further than the first quarter of the nineteenth century--here the Katz book has been helpful. So it might be said that the history of the formal U.S. education enterprise is barely a century old; that, coupled with the fact that the structure and practices of the enterprise have changed in only minor ways, accounts for a possible confusing of teacher constraints of today as belonging only to today.

The intent in this study was in part negative. I saw no purpose served by following the common historical approach; that would simply mean rewriting existing rewrites--the libraries are full of them.

The question "What is education?" was asked near the beginning of this study. It was never answered--intentionally. Only a teacher and his student can determine that answer. For anyone to define education would be like legislatures legislating morality: it really doesn't matter what the law says--the people are going to act privately (and sometimes publicly) as they are going to act. Education is going to be whatever the teacher and his student make it. Defining "education" externally thus becomes a futile exercise. The phrase "teacher-student relationship" is overworked, but under-indulged in the formal system. Theoretically, the teacher holds the power of defining education because his role is defined by the enterprise as authority over numbers. So, in the sense of this

study, he has little power. If we decide we are interested in training, we need only worry about one relationship: the most efficient one. That would be the engineer's virtue. But, in making such a decision, we shall have removed such activities of the intellect (and the emotion) traditionally labeled philosophy, literature, all the creative arts. We appear to be doing that now, reducing philosophy to knowing philosopher's names and a few key phrases. Perhaps we are fortunate that an informal education enterprise exists whereby the student can test himself, not just the correctness of his memory.

The constraints have been stated as those existing for the teacher; if education, and not training, be the goal, then those constraints are also for the student, indeed the teacher-student relationship. So, the inferred thesis of this study reads: In order to talk about education, the precondition is a teacher-student relationship conducive to substantive, not superficial, human, not mechanical, dialogue; constraints for that relationship exist in the formal education enterprise. In the final analysis, that relationship is where education is at. Out of that relationship will grow whatever education shall be. If that relationship is ever allowed to be.

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Area 319: 353-3259

Project: NCEC Knowledge Utilization Study

Research Memorandum # 9:

"Essays on Communication and Education"

Originator: Tom Deats

Date: 9 May 1972

Distribution: Project Associates*

Research Assistants*

NCEC Officials*

Practicum Participants*

Consultants

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RESEARCH MEMORANDUM #9

Contract No. OEC-0-72-0243 (519)

Essays on Communication and Education

by

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Iowa City, Iowa

May, 1972

The research reported herein was performed pursuant to a Contract No. OEC-0-72-0243 (519) with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
National Center for Educational Communication
(Division of Practice Improvement)

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These essays were originally prepared for use in an instructional package developed by the Center for the Advanced Study of Communication, University of Iowa, as part of a grant funded by the U.S. Office of Education's National Center for Educational Communication (NCEC).

Developing Human Relationships

One of the most important--perhaps most fundamental--tasks for all human beings is the development, establishment, and maintenance of human relationships; for it is upon such relationships that all human organization, including the growth, education, and development of individuals and societies, is dependent. And yet man rarely considers the development of human relationships a primary and necessary task.[1]

The establishment of human relationships is by and large taken for granted. But man can be described and defined only by the nature of his human relationships. For man, unlike other species, must learn to be what he is--man is not born human, he learns to become human. Each of us, to be sure, may be born with "a predisposition toward sociality"[2] but man, qua man, creates himself--makes himself and his world human.[3] And all of this is due to the fact that man's relationship to his world is by and large communicatively open. That is, for man, unlike most other species, there is no biologically or physiologically determined human nature which predetermines human socio-cultural enterprises and behavior. "While it is possible to say that man has a nature, it is more significant to say that

man constructs his own nature, or more simply, that man produces himself."[4] Human communication and intercommunication are the processes which subserve this creation.

Thinking About Human Communication

The aim of this essay is to discuss a theory of communication and the development of ways of thinking about communication. There has been a great deal--indeed too much--written and said about "communication" in recent years. All too often "communication" is seen as a "cure-all" for what ails modern society and modern man. It is often assumed that interpersonal, sociological, political, and educational problems are "really" only "communication problems" and that if we would only increase the amount of "communication" we would somehow become more "effective" in solving our "problems."

Philosopher Martin Heidegger once noted that modern man "is in flight from thinking."[5] Heidegger made a distinction between "calculative thinking " (i.e., thinking that plans and investigates) and "meditative thinking" (i.e., thinking that stops, collects itself and "contemplates the meaning which reigns in everything that is.") It is the latter kind of thinking from which Heidegger says contemporary man is fleeing.[6]

We might also say that modern man is in flight from thinking about communication. There can be little argument that contemporary man has created numerous communication strategies and techniques which we all use with greater or lesser degrees of success. But even with the multitude of modern communication techniques and tools at our disposal, we seldom appear to be giving much thought to the process of communication and its functions

and consequences for all of us. Too often we are concerned merely with what or how we "communicate" with little concern for the human consequences and functions.

Vast amounts of data are produced, processed, and exchanged every day with little apparent consideration of questions of whether the data is needed, useful, or even necessary for anything or anyone. Much if not most of our day-to-day "communication" is little more than chatter, a technique we have designed to close off portions of the world in order to substitute immediate information-about for thinking-about what is going on in the world. Chatter is a communicative technique designed to "protect" us from silence; a technique which serves as a barrier between us and the uncertainties of the world, ourselves, and others. As Heidegger pointed out, "Silence is a source of immeasurable dread in our Western age.... Man feels uneasy in silence, and thus our age fills the void with the noise provided by modern technology. The art of conversation seems lost, as we seek simply to fill an hour or so with chatter."[7]

Chatter "offers the possibility of understanding everything without going into anything."[8] It leads to a superficial understanding of the world, ourselves and others. Chatter "develops an average understandability to which nothing remains hidden, so that it in advance hinders and closes a deeper and more genuine approach to things. It is in itself a disguising and covering-over, although...there is no intention in it to deceive or falsify."[9]

Our day-to-day and face-to-face communicative behavior is for the most part chatter. It is often little more than organized, agreed-upon social play acting--a tossing out of standard lines and a reciting of standard responses. One author has written, "...it is reasonable to assume that

most human behavior is simply a 'playing out' of preprogrammed behavioral sequences (sophisticated habits if you wish!) and is not the consequences of studied decisioning."[10]

Chatter has been with us for quite some time--perhaps always. The creation of new communication techniques has helped its growth--as attested to by those prime examples, the mass media. Perhaps Thoreau was not far off when he said, "all news, as it is called, is gossip, and they who edit and read it are old women over their tea."[11]

A problem for those with an interest in studying and thinking about the process, functions, and consequences of human communication behavior is that chatter extends far beyond our daily conversations, the mass media, and the "news." All of us grow up in and draw our first understandings of things from chatter.[12] It is thus not too surprising that chatter has also invaded much of the current communication research methodology and theory. For example, consider some of the major topics of prime importance to daily chatter: social status, age, sex, religion, race, family life, who earns how much and how, who belongs to what clubs, groups and organizations, etc., etc. Interestingly enough these are the same factors utilized as "scientific indices" in much "scientific" communication research. Does it really make a significant difference to claim, as some researchers do, that they view these indices or factors differently (i.e., "scientifically") than non-researchers?

Essential to any attempt to answer the above question is a necessary acknowledgement of the many weaknesses inherent in the present methodological and conceptual frameworks utilized in much "communication" research. If there is really any doubt that such weaknesses exist, consider for a moment the confused and oft-times contradictory definitions and conceptualizations

offered for the term "communication." Thayer noted several years ago he had found "more than 25 conceptually different referents for this term!"[13]

However, even a clear and universally agreed-upon definition of what communication "is" will not in itself, no matter how useful a lexicographic exercise it may be, remove the conceptual stumbling blocks in contemporary communication research. Our first step in our attempt to think about communication is thus determining for ourselves what it is that we mean by "communication."

Human Communication and Intercommunication

Human communication is conceived of in this essay as a basic life process of human systems taking-something-into-account toward some end. Thus unless something is taken-into-account by some human system, whether that system be an individual or an organization of individuals, human communication has not taken place.[14]

In the most generic sense communication is viewed as one of two basic life processes common to all living systems, a process which is essentially the conversion of raw event-data into comsumable information for use by the system.[15] From this point of view raw event-data are seen as including the events, happenings, occurrings, things, objects, etc., of the corporeal, existential world as well as those data created or generated by the system which are acquired by the individual and converted into information usable toward some purpose or end.

The basic functions subserved by the process of communication for all living systems are those of informing the system in order that it might develop adaptive relationships with aspects of the environment and/or

in-forming the system in order to establish, confirm or deny those created relationships as they relate to the vital purposes or ends of the system.[16]

All living systems are viewed as functioning in the world communicatively on information and not on raw event-data. For some living systems the data serve as both the necessary and the sufficient condition for communication. That is, for many living systems the in-forming functions and capabilities are so established or programmed in their relationship to the environment that they are in-formationally closed systems. The capacities, abilities, etc., of these systems to take-into-account aspects of their environments are pre-structured to such a great degree that the "kinds of information" available to or processible by such systems are necessarily predetermined by the limits of the system and the raw event-data.

Man, however, is not only informed through the process of communication but he is also relatively more than the "lower" creatures in-formed. An important and useful conceptual distinction can be developed here between teleological and telesitic behavior; the former being that behavior "...which a complex living system can or must engage in to its own end..." and the latter (telesitic) "...that which man (e.g.) would engage in to some further end."[17] Such a distinction allows for the development of a conceptual framework within which it is possible to account for qualities necessary for and unique to human communication. In the present process-oriented view all living systems to a greater or lesser degree exhibit teleological behavior to the extent that they are constantly involved in becoming what they are, and are thus manifesting purposive behavior. For example, in the more "simple" animals this may be viewed as a process which is essentially one of coming to terms with the environment through adaptation. None of this is meant to imply or impute to such purposive or teleological behavior

metaphysical qualities of causal determination be they "first," "efficient," or "final." The emphasis here is upon purposive behavior exhibited by systems in the process of becoming what they are, rather than upon an idealization of intrinsic ends or goals. Dewey distinguished between what he called natural ends and ends-in-view.[18] In the present scheme teleological behavior can be linked with natural ends in process, and telesitic behavior with the notion of ends-in-view which for man are often (but not always) intellectual and regulative means. Or, as Thayer has put it, man's telesitic behavior is "...covert or overt behavior undertaken as rational or 'intelligent' means to self-determined ends."[19] Human behavior as conceived of here should be taken to mean "...behavior with the understanding that is human."[20]

Human beings function in the world on the basis of their information-about the world--information created from event-data through the processes of communication and intercommunication. For man there is no necessary and sufficient relationship between what is "really" happening in the world and the way he conceives of that world and its events. Man exists in a dimension of reality unlike that of any other species largely as a consequence of the emergence of the biological capacity of self-reflexivity and the development of human communicational realities. Man as a telesitic system can and does conceive of himself in relation to his environment. He can and does conceive of himself conceiving of himself. Man not only is constantly becoming what he is, but is also in the process of becoming what he is not, i.e., what he would be.

All living systems exhibit "nervous activity" or reflex action. But only man, to any great degree, also exhibits self-reflexivity. "Man, then rather than by what he is, or by what he has, escapes the zoological scale

by what he does, by his conduct. Hence it is that he must always keep watch on himself."[21]

But the capacity of self-reflexivity--if it grants man the possibility of successfully "escaping" the zoological scale--also burdens him with the possibility of failure--the possibility that he will fail to attain what he would become.[22] And as Thayer has noted, this is a possibility "...having considerable import for the condition of man and for the evolution of his particular institutions and ideologies."[23]

What it is that man would become--indeed what it is that being human means--varies in greater or lesser degree from culture to culture, from individual to individual, from situation to situation, across time and space. What is common to all human beings is the fact that the process of becoming human always takes place in transactional interrelationship with environments--"natural" or physical environments and created or invented human environments.[24] We are, as Whitehead put it, in the world and the world is in us.

What is also shared by all human beings is the fact that "Whatever it is that man does, qua man, can be carried out only in and through communication and intercommunication."[25] The significance of this fact cannot be over-emphasized. Man has but two ways of affecting or in turn being affected by his environments: physically or communicationally.[26] Man is his communication experiences; and as man he can only become what it is that his communicational realities--his communicational ecologies or environments--enable or disable him to be.[27]

Human conduct is dependent upon human communicational realities which are created only in and through human communication and intercommunication, "...the nature of man and of men depends upon the images of themselves they

adopt."[28] Thus man, unlike any other species, has created and developed complex technologies of communication which enable (and disable) him to engage in communicational behavior and activities. While much, if not most, human communication occurs at levels "below" that of intellectual awareness, the meaning and the significance of what is taken-into-account by the individual must be learned through social transactions with others, that is, through intercommunication.

Although it is accurate to say as Dewey did, "If we had not talked to others and they with us, we should never talk to and with ourselves";[29] the unique aspect of human communication is not that people talk to each other but that they talk to themselves.[30] Talking always has certain consequences.[31] Man's self creation is always a social endeavor. "Men <u>together</u> produce a human environment, with the totality of its socio-cultural and psychological formations.... As soon as one observes phenomena that are specifically human, one enters the realm of the social. Man's specific humanity and his sociality are inextricably intertwined."[32] Hence the importance of learning and thinking about communication.

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[32]Berger and Luckman, The Social Creation of Reality, p. 51.

Education and Communication: Toward a New Perspective

Man learns many things and in many different ways, but always underlying his learning is the basic process of human communication. Communication is the foundation upon which all organized human behavior is built.

Communication may be thought of as a basic life process which enables individuals (and organizations) to come to terms with and to order and to control aspects of their environments including themselves and others. The process of communication is envisioned as one constituted of continuing instances of, or specific acts of, taking-into-account which, because each is to a greater or lesser degree unique, individual, and specific, differ in quality and content and thus in importance and value. The general process is value free, but the specific instances of communication are shaped by value considerations. (This point may be clearer if we note that the process of breathing can be conceived of as being the same for all humans, but the individual and specific instances of breathing vary a great deal as they are influenced by environmental factors including time, place, the overall quality of the air, the physical condition of the individual, etc.)

There are several levels of analysis from which one may approach communication phenomena. For example, Thayer has outlined a useful division between:

1. the intrapersonal
2. the interpersonal
3. the organizational
4. the organization-environment interface
5. the technological.[1]

In all of these levels while the functions and consequences of communication may differ, the generic process of communication is the same and subsumes the individual or particular instances of taking-into-account. The total communication process is continuous and not episodic except to the extent that we may wish to talk about one particular instance of communication. The "pulling out" of one instance from the process stream is but an analytical device for we cannot in fact separate the instances of communication from the process. In making this point we are in agreement with Bentley who noted that, "Behaviors are present events converging pasts into futures. They cannot be reduced to successions of instants nor to successions of locations. They themselves span extention and duration. The pasts and the futures are rather phases of behavior than its control."[2]

The study of the communication process alone will not enable us to adequately explain or predict forms of behavior, nor will it allow us to understand the functions and the consequences of such behavior. To study process alone would "at best account for everything in general and nothing in particular."[3] We must, then, turn to specific kinds of communicational phenomena such as activities and behaviors in groups if we are to understand the importance and the ubiquity of human communication.

In this light it may prove useful to think of the communication process as an internal process of individuals in social settings, and to think of communicational behaviors as the more overt and observable social transactions

of and between individuals and groups. In this view activities or behaviors such as writing, reading, talking, gesturing, etc., are not conceived of as communication but as communication behaviors. Communication does not occur "out there" between individuals but within individuals; the social transactions, the communicational activities, occur between individuals and groups.

The usefulness of this point of view can be apparent in helping us to avoid utilizing such phrases as: "a lack of communication" or "miscommunication" or "he didn't (or doesn't) communicate" to "explain" our social and transactional failures. In a classroom of 40 children and one teacher there are 41 individuals communicating whether or not anyone is talking at the particular moment. Each individual in that classroom is, to a greater or lesser degree, taking things into account from his own vantage point. When the teacher's "message" fails to elicit the "correct" or expected response from the students the fault is not "a lack of communication" but, more likely, either a misunderstanding or a deliberate rejection of the teacher's request or demand, or "inadequate" socialization.

The individual student's communicational competencies may be such that he or she cannot or will not construct a conceptual model that anywhere comes close to matching the teacher's model or the models of the other students. On the other hand, the students may very well "get the teacher's message" and reject it out of hand. To attempt to "explain" such behavior as a "lack of communication" or as "miscommunication" serves little if any useful purpose.

Learning is a form of human experience and education, in the form of schooling it is a specialized mode of learning experience which is usually more disciplined socially and psychologically than less formal and less

overtly controlled forms of learning. Human learning in the sense outlined above is social just as all human behavior is social. The importance of this fact cannot be over-stressed. While it is true that the individual's own communication competencies provide the means for learning, society provides and shapes most of the ways of handling the raw material. Fundamentally, learning consists of utilizing the information produced through communication to develop ways of structuring the world, of building meaningful connections and relationships between things, symbols, events and people, thus enabling the individual to "make sense" out of what's apparently happening in the world "out there." Although "formal education" tends to be a more disciplined form of learning experience than incidental learning, it is still rooted in the individual's social experience and hence, ultimately in communication and intercommunication. The conceptual models of the world that we construct are learned--and education as schooling provides a more disciplined and usually more uniform method (not necessarily better) of conceptual construction than incidental learning.

> All that society has accomplished for itself is put, through the agency of the school, at the disposal of its future members. All its better thoughts of itself it hopes to realize through the new possibilities thus opened to its future self. Here individualism and socialism are at one. Only by being true to the full growth of all the individuals who make it up, can society by any chance be true to itself....[4]

Each individual comes to the learning situation with similiar and yet somewhat different frames of reference and models of the world which have been built up from the information produced through the communication process. The scraps of information provide the material from which meaningful and intelligent patterns of thought and desisions may be developed--but unless such development occurs we have only bits or scraps of information--

and not very useful information at that. To be "informed" is not the same as being knowledgeable.

> A merely well-informed man is the most useless bore on God's earth.... We have to remember that the valuable intellectual development is self-development, and that it mostly takes place between the ages of sixteen and thirty. As to training, the most important part is given by mothers before the age of twelve....[5]

The individual must learn to make significant connections between his bits of information in order to utilize this information in the most successful manner. The facilitation of the development of the individual's communication competencies would thus appear to be of primary importance to educators; for this development should lead to the individual student's increased ability to shape and combine other's ideas into his own. It is only when we "have" ideas and conceptualizations which are ours to use, and have the ability to use them, that we can really say we "understand" what we "know." There is a significant difference between knowing something and knowing-about something. When we truly "have" our own ideas we make use of them, fit things together, create and discover new connections and relationships in the world.

Bruner has pointed out that understanding necessarily leads from one way of conceiving of something to another way or ways of conceiving of it.[6] Thus, the development of the abilities and the capabilities necessary for the construction of abstract conceptualizations and the structuring of cognitive relationships and patterns, is a far more important aspect of "formal education" than the learning of particular bits of information. Information must be useful to the individual in order for him to act effectively. The ability to fit things together, to make sense of the chaos, enables one to make use of his information and to develop a sense of continuity in

experiencing the world which permits the predicting of consequences of actions. This is learning in the best sense of the word, and it enables one to develop disciplined understandings.

The ideas in this essay represent the expression of an action-and-future-oriented view of education and learning which stresses the individual's development of problem naming and solving skills, techniques, and habits. Although it is far beyond the scope of this essay to fully explore logical and epistemological assumption behind this view, it is important to note that this viewpoint contends that the present is determined or conditioned by the future rather than by the past. Thus, the "locus of social reality" is seen as being in "the present, for it is the attempt to solve problems in the present that (sic) determine the past and future we invoke to sustain action in the present..."; an approach which conflicts with those developed by European thinkers who view the present as being determined by the past.[7]

Without a modicum of surity and faith in our interpretations of the environment and the possible consequences of our actions, we are precluded from undertaking effective action. Kilpatrick and Cantril have pointed out that "we act not in terms of what 'is' but in terms of a prognosis of what 'will be' at the projected point in time at which we expect our act to take effect on whatever it is we are dealing with, whether an object, a person, or a long-range aspiration we are trying to achieve."[8] This being the case, it would appear that the most effective way to structure the learning situation, if we are concerned with the development and continued growth of the individual as an active, effective social being, would be to facilitate the individual's active participation in coping with and manipulating important aspects of his social and communicational environments.

The teacher could thus act as a facilitator and guide, providing external structure, not in the form of overt coercion, but in the selecting of appropriate material for study, the assessing of the student's abilities and capabilities, and in the directing of the student into situations wherein the student must utilize his own initiative and creativeness to name and to solve problems.

Learning in the sense of education requires conscious action and thought on the part of the student. Dewey long ago noted that "sugar coating" educational subjects is not the answer to making disagreeable subjects agreeable or "interesting" to students. "Mental assimilation is a matter of consciousness; and if the attention has not been playing upon the actual material, that has not been apprehended, nor worked into the faculty."[9]

In short, learning is sometimes very hard work and often there is no "easy way" to learn. Thus the need for structure and guidance from the teacher: "Action is response; it is adaptation, adjustment. There is no such thing as sheer self-activity possible--because all activity takes place in a medium, in a situation, and with reference to its conditions."[10] The way in which we structure our educational institutions and their learning environments (both social and communicational) will have a great deal of impact upon the kinds of learning abilities and disabilities that we and others develop. Although learning is an individual matter in the sense that it is individuals who learn, human learning takes place within specific social contexts and situations.

As we have seen, each of us constructs his own personalized world views within the general social setting and through our transactions with ourselves and others. Each of our world views is to a greater or lesser degree individual, unique, and specific--but the kinds of social settings, the kinds of

learning opportunities that the social settings permit or prohibit, by in large shape and determine the quality of the kinds of world views we create and hence, shape and determine the kinds of persons we are. We are, each and all of us, our creations and creators.

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Facilitating Learning Through Simulation

Education in its most generic sense can be conceived of as a social process of disciplined learning leading to disciplined understandings or views of the world. "The goal of education is disciplined understanding; that is the process as well."[1] Education is conceived of in this instructional package as a continuing sociological-psychological process of human learning and creating of understandings of aspects of the world, one's self, and their interrelatedness, a process of which "formal education" (or schooling) is but a part.

Like human communication, learning may be conceived of as a life process; a process which should begin at birth and end only at death. Unfortunately many people today apparently regard learning and education as processes of preparation for future living (e.g., training for employment) rather than as processes of living.[2] The assumption is often made that when one is "grown-up" or leaves school his education, if not complete, is at least at an end. But education is not child's play and is better viewed as a life process of disciplined growth--and not an end in and of itself.

Emerson noted that "The purpose of life seems to be to acquaint a man with himself. He is not to live to the future as described to him, but to

live to the real future by living to the real present."[3] The primary goal of human education, we believe, is the development of human competencies which will permit people to "...define themselves in such a manner that they are much less functions-of-the-situation and more independent actors."[4] This is not to be construed as arguing that man can somehow be defined, described, or "known" in any way other than by the nature of his relationships. As Ortega y Gasset put it: "Our life proceeds as a function of our environment, which in turn depends upon our sensibility."[5] Man always finds himself in a context or situation.[6] It is, in fact, virtually impossible to "differentiate oneself from a defining relation."[7] The goal of education can perhaps most clearly be seen as one of developing alternative definitions of human relationships; in short, of developing human communication competencies for expanding and enriching our human reference systems.

The process of education must permit students to think for themselves, to develop the competencies which will permit them to come to handle problems and difficult situations as they arise, and to be able to name those problems in new, and possibly more functional ways.

Many teachers are more than likely well aware of the fact that much of the educational research and many of the "traditional" methods of "educating" take into account at best only half of what happens during the learning process because what is emphasized the most is external to the learners. These external events include the traditional imposition of rules for learning and ways of assessing how much has been learned. In other words, the

imposition of conformity and uniformity across "naturally" different learners. But the most important part of learning involves individual, internal factors which greatly influence, if not control, the nature of education and learning. Concentration on the external aspects of education assumes that knowledge is passive, static, and can be transplanted. Such a view tends to assume that that which is not learned is solely the fault of the learner or the teacher: But education is an enterprise in which both educators and learners must be actively involved if it is to be successful. To acknowledge that individual internal factors are a part of this involvement implies that knowledge is active and must be actively acquired by learners from situations which make such active acquisition possible.

The assumption that knowledge must be actively acquired also implies the notion of process--that knowledge is not a "thing" but rather, a dynamic relationship between knower and known. Learners cannot be separated from what is learned, and neither learners nor what is learned can be separated from the conditions under which learning takes place. There is a continuous transactional relationship between and among learners, what is learned, and the total situation; the active participation of learners in "discovering" the purposes of education is indispensible to the development of their individual intellectual competencies. In short, students must find their own rules for learning. They can be helped in this search by educators who structure the learning situation in such a manner that the internal individual factors are emphasized.

What is implied here is a blending of theory and practice--a combination, which, if properly mixed, can put both within the grasp of students. An understanding of the theoretical implications of any sort of practice (be it teaching, law, medicine, or business management), is a step toward understanding

the consequences of the theory underlying that practice. And the meaning or significance of a theory lies in its consequences for human action. It can be argued that to the extent methods and techniques of education and communication fail to function in terms of their underlying theoretical framework(s), we fail to fully explore, develop, and test those theories. It is only when we are aware of the implicit assumptions of the theories we use that we can fully understand the consequences of any particular theoretical approach.

For example, for many years communication researchers thought that "what" was "communicated" to "whom" through which "channel" was an adequate and proper model for human communication research. However, with an increasing awareness that the closed-system-model developed by this approach failed to account for many aspects of human communicational behavior, a reassessment of the fundamental assumptions behind those models indicated to many that a more dynamic, open-system, process-oriented view or model was needed.

Open living systems such as humans do not readily lend themselves to models of a mathematical nature nor to static descriptions of a stimulas-response, $A \rightarrow B = X$ approach. Closed systems are more readily described in static terms and hence are easier to model than open systems. The development of open-systems theories of human communication, however, does not preclude the construction of rigorous and precise models which may prove useful in enabling one to come to grips with the dynamic aspects of human communication and communication behavior, learning, etc.

From our experience we have learned that in education and in the study of human communication it is often useful to develop systemic simulation models. There are several reasons, for example: 1) simulated systems enable one to overcome in part the inherent difficulty in manipulating "natural" systems; 2) simulated systems permit the observer (student or teacher) to concentrate on those aspects of the system and the process which are of primary interest to the course of inquiry at hand, and to eliminate those aspects which, for purposes of the inquiry, are trivial or irrelevant; 3) a systemic simulation offers one the opportunity of observing various processes "as they happen" and, because simulation is theoretical, permits one to more closely relate theory and practice; 4) a simulation approach in human communication research also serves to remind the researcher, the student, and the teacher, that although the simulated system is a human creation, all of man's social systems are human creations and thus "artifactual;" 5) in developing simulated communication systems involving students, the participation in the simulation enables the students to become directly involved in the very processes and utilization of the theories they are studying, and thus may develop a better understanding of the relationships between communication theory and practice, and between communication processes and their concomitant functions and consequences.

Theory is conceived of here as being a way of seeing (or not seeing) and understanding (or misunderstanding) things, situations, events, etc., with some purpose. Simulation can be seen as a special form of theory which, better than some other forms, allows us to represent and observe dynamic human processes.[8] The ultimate test of any theory lies in how it enables us to develop ways of thinking and talking about our world and coping with that

world. Thus, as Thayer has noted, the test of a good theory lies not in arguments over whether one theoretical approach is true and another false, but whether the approach helps in practice over other ways of understanding.[9]

Simulation and games can play important roles in theory development and as educational technologies. If we have a dynamic, process-oriented view of human communication, for example, simulation permits us to develop and to present this viewpoint so that its dynamic-process qualities are highlighted for the student. The dimension of openness is of crucial importance. For, as we vary the "openness" of the system we can experiment with and think about the "openness" of the process of human communication. Simulation viewed as theory rather than as an attempt to isomorphically represent "reality" allows one to compare simulation with other theoretical forms, (e.g., verbal games) and to judge the adequacy and the relevancy of these various theoretical forms as explanatory tools in the conduct of inquiry, as well as in the conduct of education.

Now, the development of theory yields principles which indicate ways of accomplishing things--of successfully coping with the environment. In attempting to achieve our intentions and purposes, we operate on our principles--our expectations of what is to come. If these principles appear to us to work well we tend to hang onto them. When they no longer seem to work well, that is, when we fail to accomplish what we set out to accomplish we can either 1) keep on failing or 2) develop alternative principles for action, or 3) we may even attempt to create radically new theories. In communication research many have taken the latter course and instead of continuing to work within what appeared to be an outmoded and intellectually confining theoretical frameworks of closed system principles, have been developing new and hopefully more promising frameworks of dynamic, open-systems principles.

There is no lack of models, theories, or conceptualizations of "communication" and one may be more than justified in complaining about the apparent unrestrained growth of conceptual models and oft-times sterile empirical data.[10] But diversity of thought is useful and necessary and thus the expansion of conceptualizations about communication is probably a sign of healthy growth. For one thing, this growth has evidenced the development of dynamic, process-oriented models of the communication process which appear to be useful in explaining the diverse functions and consequences of human communication.

For example, in the past a great deal of emphasis was placed upon the supposed rationality and awareness inherent in human communication. It now appears that, in fact, what, when, why, and how man "communicates" is by and large continuous, non-conscious, habitual, and automatic.[11] And this is apparently so in varying degrees not only at different levels but also across those levels.

Human communication is conceived of here as a dynamic, continuous life process of taking-into-account aspects of the environment by the individual (system) toward some end or purpose. The process involves the acquisition, creation or generation of raw event-data and the conversion of this data into usable information-about the world for utilization at present or at some future time.

People operate in the world on the basis of their information-about the world and that information is, as just stated, created by the individual (system) from raw event-data. The ways and the means that each individual develops and utilizes in the creation of information-about may vary a great deal over time, from situation, and in comparison to other individuals; but

the fundamental functions of the process remain essentially the same for all individuals at this generic conceptual level.

Man unlike any other species, creates and develops technologies of communication which enable and disable him to engage in communicational behavior and activities. While much, if not most, human communication occurs at levels "below" that of intellectual awareness, the meaning and the significance of what is taken-into-account by the individual must be learned through social transactions with others, that is, through inter-communication. Thus as Dewey said, "If we had not talked to others and they with us, we should never talk to and with ourselves."[12]

Thayer points out that what makes human communication unique is not the fact that people talk to each other, but that they talk to themselves. Human conduct is dependent upon the "communicational realities", the conceptual artifacts, that man creates in communication with others and with himself. It is the communicational artifactual world--the world of communication realities--that man "knows." Man can only act upon the basis of how and what he conceives the world to be and what he believes his relationship to that world is. Thus, our created information-about the corporeal world, us, and others--not the raw event data--is the "stuff" of our communicational reality and is the determinant of human social behavior. Communication, the basic life process subserving the creation of our information-about the world, is the end and the means of all organized human behavior.[13]

In accepting the above theoretical position, one can no longer hold that the goal of inquiry is to discover what the world is "really" like. All that we can ever "know" is developed through our conceptual constructs which we have developed through our past experience in light of what we expect to

happen. Thus man "knows" the world and himself through his communicational artifacts. One important aspect of this entire process is that man can simulate his behavior and its anticipated consequences before actually carrying out that behavior.[14]

Given such an approach, what are the implications for education? For one thing the traditional concept of "objectivity" such as in science assumes a way of knowing which is improbable, if not impossible, for man. Objectivity assumes that one can literally be beside oneself to observe "reality" as it really "is." Some of us apparently believe that if only our senses were more accurate, our theories more certain, our data more revealing and less ambiguous and our instruments more "precise" then we could really be able to know "reality" and discover "truth."

> Even the term, "simulation," carries some of this kind of freight. Simulation must be something artificial which is good simulation to the extent it represents or is isomorphic to reality. No? No. We invent both our realities and our simulations. We postulate reality. We construct our theories about that reality and how it works. As we said earlier, simulation is simply one form of theory. We cannot compare simulation with reality (as many simulators say they are doing), since "reality" (other than one's own) itself is not available to us.[15]

This position assumes that each individual is a learning system and that learning is an individual and natural life process. Educational systems can be viewed as two or more people (learning systems) in a controlled relationship which is to a greater or lesser degree either "open" or "closed." The openness or closedness of an educational system depends in large part upon the environment, and in (particularly in contrived educational systems such as public education) the "reasons(s)" behind the system's existence and the desired output.

As a control system an educational system supposedly determines the "input" and the "output" within established parameters of acceptability.

Thus what a student learns and the kind of students an educational system "turns out" are often thought to be determined by the way those people in power within the system think the student ought to learn what the student ought to know.

However, except in rare instances this is not the case. Far too often desired "output" of an educational system is poorly conceived and designed; and without a clear picture of what the "output" of the system is to be it is improbable that the system can be either efficient or effective in the ways educators would like to believe.

The development of instructional simulation exercises may provide us with tools which, although not "the answer" to educational problems, may offer ways of dealing with troublesome aspects of learning system-educational system problems.

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Educators and "Information" Systems

Historically, public education in the United States has been the responsibility of the individual states rather than the federal government. As a result, a complex array of diverse educational training and research operations has grown into being. In recent years the federal government has become more and more an agent in the dissemination of educational research information and data throughout the country. The major purpose of this essay is to develop a few thoughts and questions about the organization, functions, and the consequences of the establishment and operation of educational "information" (i.e., data) disseminating services and programs. Of particular interest and emphasis in this essay is the Educational Resources Information Center (ERIC) which is a program of the Bureau of Research of the U.S. Office of Education.

In very general terms one can say that traditionally there have been three major sources of dissemination of educational research information in the United States. These have been: (1) professional associations; (2) universities; (3) government agencies.[1] Under these generic headings, one could also place the sources for most of the educational research programs in this

country except those which are funded and operated by private and industrial organizations. In developing such a taxonomy one must keep in mind that "The research structures in the United States that relate to education are so numerous and diversified that it is impossible to speak with unassailable authority about their current activities and organizational patterns."[2]

At any rate, the U.S. Office of Education tends to view three audiences as being the primary targets of its educational research dissemination programs. These are: (1) researchers; (2) educational decision-makers and practitioners; (3) the general public.[3] Ostensibly, the ERIC system was designed to build "a national information system dedicated to the progress of education through dissemination of educational resources and research-related material."[4] The ERIC program was developed by the Office of Education primarily because USOE people saw a need for obtaining information about the various research and development projects funded by that office, and because USOE people believed that educators needed to have ready access to the work of other educators and educational researchers.

From its beginning the ERIC system was designed to be a de-centralized nation-wide information system whose "products" would be developed and disseminated by subject area experts rather than by information system specialists, data librarians, or documentalists.[5] The primary objective of the ERIC system centers on the dissemination and the utilization of educational information within the "educational community." At present the major functions of ERIC clearinghouses include:

--The identification and acquisition of "fugitive" documents and literature such as technical reports, unpublished speeches, etc.

--Evaluation of the literature collected from all sources.

--Indexing and abstracting documents, literature, etc., for inclusion in the monthly ERIC catalogues, RIE, etc.

--Building and maintaining local clearinghouse files of documents, literature, etc.

--Analyzing information which is of general interest to the educational community and presenting such analysis in state-of-the-art papers, reviews, bibliographies, etc.

--Providing copies of documents which are not readily available from other federal clearinghouses or information systems, or which are not "in" the central ERIC system.

--Development and maintenance of close ties with professional associations, organizations, and agencies in the educational communities served by the particular clearinghouse.

In much of the literature about various data systems, "information" is spoken of as a product which can be "marketed" to consumers or users of the particular information system.[6] Marron, for example, sees the ERIC system serving as a "...wholesaler of information products and services...." in the educational community. One of the aspects common to such an approach is the emphasis placed upon the need to "advertise" the system in order to create or develop "awareness" of the system in potential users, and to increase the rate of utilization. Marron sees "...the development of a comprehensive announcement service..." as one major prerequisite "...for the widespread utilization and adoption of new ideas and practices in education."[7] Veazie and Connolly point up the growing interest in the development and utilization of advertising and promotional campaigns by the various federal information and information-analysis centers.[8]

In their system the ERIC people view the relationship between the central system (ERIC) and the local and state operated centers and other USOE operated research and development centers and laboratories as a kind of "information merchandising" in the market place of educational ideas.

Apparently one of the basic assumptions behind the rationale of the ERIC system (and other USOE information systems) is that educational research "information" is a "product" which educators in the field not only need, but want and will be willing to "buy" (i.e., expend some time and energy in order to obtain) if they only know about it or were "aware" of its availability.

From a study of the newsletters, information aids, and instructional booklets of the ERIC clearinghouses and the related Regional Labs, Material Centers, Research and Development Centers, it is clear that many of the people involved in the development and dissemination of educational research assume that increased awareness is closely related to increased utilization. This often appears to be viewed as a necessary and sufficient condition. Thus, the failure of school teachers to utilize to any great extent an information system such as ERIC is viewed by many as a "communication problem" which can be "solved" by increased production of "news" about the system, different "packaging techniques," brochures, workbooks, film strips, and records on how to use ERIC, putting on film what was in print, videotaping lectures, etc.

In addition the ERIC planners feel that it is crucial to increased utilization to "develop a multi-level set of resources and organizations to provide the more direct information and consultive services for the user community."[9] Thus the ERIC system builders plan to establish and maintain relationships with regional laboratories, research and development centers, instructional materials centers, state-operated agencies, and local "one-stop" information centers. Such organizations are seen as links between the "information" system and the ultimate "users" of the "information;" a design similar to that developed years ago by the agricultural extension service.

In fact, much of the conceptual framework upon which the ERIC system is built is directly related to the conceptualizations on innovation, knowledge utilization, diffusion of ideas, etc., developed in studies of agricultural practices in this country.

This is not very surprising since much of the early and most noted literature on change, innovation, diffusion, and adoption dealt with agricultural practices. These early studies postulated specific "stages" or "steps" in the adoption and communication processes; stages which were conceived of as necessary and sufficient conditions for the processes to occur.[10] The step or stage approach in innovation studies lent itself to the use of scalogram analysis and, thus, to supposed statistical or "scientific" reliability of test results. At least one writer has claimed that awareness and adoption are the necessary and the sufficient conditions for adoption of ideas or practices.[11]

But such approaches tend to view the human communication process in rather static and/or unidimensional terms and often fail to develop critical distinctions between tactical and strategic levels of analysis. The failure of teachers to utilize information systems such as ERIC most likely is not a tactical communication problem, but may be a strategic communication problem. It might not be a "communication problem" at all.

In the study of "communication problems" it is of paramount importance to determine from the outset what one wants to mean by "communication" and what constitutes a "communication problem." If it is useful to think of a situation as a "communication problem," then it becomes important to distinguish between tactical and strategic levels of analysis.[12] A major fault of many studies of "communication problems" stems from a failure to develop clear conceptual distinctions between communication systems, data systems, and tactical and strategic levels of analysis.

Communication is conceived of here as a basic life process of living systems taking-something-into-account toward some end or purpose.[13] Thus unless something is taken-into-account by some living system, whether that system be an individual organism or an organization of individuals, communication has not taken place.

In the most generic sense communication is viewed as one of two basic life processes common to all living systems which is essentially the conversion of raw event-data into consumable information for use by the system.[14] From this point of view raw event-data are seen as including the events, happenings, occurrings, things, objects, etc., of the corporeal, existential world as well as those created or generated by the individual which are acquired by the individual and converted into information usable toward some purpose or end.

The basic functions subserved by the process of communication for all living systems are those of "informing" the individual in order that it might develop adaptive relationships with aspects of the environment and/or "in-forming" the individual in order to confirm or deny those created relationships as they relate to the vital purposes or ends of the individual.

A conceptual distinction is also made here between "communication" as an individual, personal, or single-system process and "intercommunication" as a mutual process involving two or more living systems. These two levels of communication can be viewed as two different processes subserving different (albeit often related) ends or purposes; the distinction between the two is primarily in the different functions each subserves. At the level of intercommunication the basic functions subserved are those of the "...intentional and mutual production and consumption of event-data..." and the "...building and/or confirming of aggregate structures such as family units,

communities, societies, etc., and at the human level, of institutions, cultures, ideologies, etc...."[15]

Living systems are viewed as functioning in the world communicatively on information and not on raw event-data.[16] The two most basic functions subserved by the communication process are those of in-forming and informing the system.[17] All information upon which a given system may operate is determined by that system's in-forming through previous experience or inate abilities and capabilities. Most information is utilized by the system to satisfy temporary ends or purposes (e.g., physical adaptation to a specific, temporary event or object.)

At the in-formation level are represented those strategic, vital comprehending-evaluating abilities, susceptibilities, competencies, expectations, etc., of the individual which determine what kinds of information the individual can and will produce and utilize.

Communication competencies thus involve two levels: the strategic and the tactical. The strategic level may be thought of as that level concerned with the ways and means of "seeing" the world, and the tactical level as that level concerned with ways and means of operationalizing those ways of seeing. Thus the strategic level involves conceptual-evaluative orientations of a communication system vital to that system's continued existence and growth; the tactical level involves the use and the development of various communicational skills and techniques necessary for growth and survival.

Each of us acts upon the basis of our information-about what is apparently happening in the world, not upon the raw event-data. Each of us, to a greater or lesser degree, creates his own communicational realities and communicational contexts. The human communicational context is always

conditioned in part by the individual's communication competencies and his information-about the world which he has created and/or generated from the raw event-data.

The communicational context may be viewed in Dewey's terms as including at least the aspects of "background" and the "selective interest" of the individual.[18] The communicational context serves as a matrix in the organization and ordering of raw event-data.

It is useful to view "information" systems such as libraries, data banks, etc., not as communication systems, but rather, as data systems. Communication systems are conceived of as living systems and may be thought of as being behaviorally inductive while "information" systems are logically deductive.[19] Thus, when an individual uses an "information" system (i.e., data system) the latter does not provide information, but rather, raw data, which in turn are developed (or not) by the individual into usable information. "Data become information when they are part of a model of explanation."[20] Only individuals are capable of developing and using models of explanation.

The implications should be clear for "information" system designers and users in the field of education. The data stored in such systems as ERIC will be useful to educators, teachers, students, etc., only to the extent that those system users have the communication competencies to create usable or consumable information out of the data. The usefulness of the data stored in "information" systems is thus a function of the system creators and the system users at both the "input" and the "outtake" stages.

The system users at the "input" end of the system may have communication competencies which permit them to construe particular data, as "useful," "good," etc., for whatever reason, while the system users at the "outtake" end of the system may have communication competencies which preclude finding

the stored data "useful." The usefulness of data and stored "information" can only be determined by the particular individual's criteria in a particular communicational context. Thus to determine the usefulness of an educational "information"system such as ERIC, one should look not at the stored data, nor to some "objective" criterion outside the system, but to the criteria of the individual users for whom the system is designed and operated.

If human communication is envisioned as a process, a primary aim of which is to develop organization and control of information and ways of seeing the world, it can be seen that much of what man "communicates" and how he "communicates" are basically conservative--i.e., operate to minimize not maximize innovation and change. We tend to hang onto those ways of viewing the world which have proven most useful to us in the past. New models, new ways of seeing threaten the old ways.

Some people are apparently satisfied with a few basic views of the world, while others, for whatever reasons, are satisfied only with diverse and changing viewpoints. If teachers were good inquiring systems, what kind of information would they seek--what kinds of data systems would best serve the teacher's interests?

In order to answer such a question it is necessary to look at the communication and intercommunication patterns and practices of teachers and attempt to assess the implications that these might or might not have for the establishment, growth, and maintenance of the kinds of "information" systems currently being utilized by teachers. It would also seem to be necessary to study the existing communication and intercommunication patterns and practices of teachers when considering the design and development of the kind of educational "information" system teachers <u>say</u> they would like to have. (The question of what kind of "information" system or the

kind of "information" teachers ought to be utilizing is not, strictly speaking, a "communication problem." It may become a "communication problem" if and when the communication and intercommunication patterns and practices of teachers are so mis-matched strategically and tactically with those of "information" system designers or builders that neither can take each other into account in meaningful and useful ways. A "communication problem" may also result if the strategic communication competencies of teachers are such that they cannot adequately deal with the existing paradoxes in the current differing views of what education and the educational enterprise are all about.)

An inherent difficulty in any study of the relationship between communication systems and data systems stems from the fact, mentioned earlier, that communication systems are behaviorally inductive and data systems are logically deductive. In short, human communication systems develop and evolve as a function and consequence of the human intercommunication which takes place; data systems are more or less rationally created to serve contrived, specifiable goals or ends of communication systems.

Generally, the more specifiable the ends or goals--the more "closed" the system--the more organized, predictable, and "efficient" are the uses of the data and "information." The less specifiable the ends or goals--the more "open" the system--the less organized, less predictable, and less "efficient" the "information" utilization. However, in order to become and remain a viable living system an individual or organization must develop a communication system which exhibits traits of both "openness" and "closedness."

All human communication systems to a greater or lesser degree exhibit simultaneous traits of "openness" and "closedness" in their organizational patterns vis-à-vis their interdependent environmental realtionships. It is helpful to make a distinction between inquiring systems and acquiring systems. Generally, acquiring systems are conceived of here as being essentially evolved, teleological systems, i.e., systems primarily utilizing acquired data and created information to further functions of simply being or becoming what they are. On the other hand, inquiring systems are viewed as being essentially created, or socially invented telesitic systems; the data, information, and "knowledges" of an inquiring system are utilized primarily toward self-organizing functions of developing intricate conceptualizations of relationships with its environments and itself, and in attempting to realize sought-for or intended goals or ends. The inquiring system is essentially a seeking system--it seeks to become what it is not, to create itself through overt or covert manipulation of perceived means to self-determined ends.

All living systems have a structure, function in the world, and have a history, i.e., undergo changes over time.[21] Because all living systems operate on the basis of information created from raw event-data, the fundamental condition underlying any living system's viability (continued functioning) is information or "knowledge" utilization. For an acquiring system the mere fact of information utilization is both the necessary and the sufficient condition for system viability. For an inquiring system the mere fact of information utilization is only a necessary condition for continued

system viability. One must also look to the functions of the utilization in order to find the sufficient conditions for system viability in inquiring systems. The "openness" or "closedness" of any living system is not solely a function of the amount of information utilized (although some data system designers would apparently have us believe so); for living systems the quality of the created information is of paramount importance.

It is possible to conclude that to the extent a system's information "needs" or requirements are specifiable, determinable, and completeable the system is "closed" informationally. To the extent that a system's information "needs" or requirements are non-specifiable, non-determinable, and non-completeable the system is informationally "open." Thus, to the extent that a particular job or task is viewed as having specifiable, determinable, procedures and processes, and is "completeable" the information requirements can be predetermined.

The question can be raised as to how much of what a teacher "needs" to know is specifiable and determinable in advance. Any answer to this would appear to hinge at least in part upon how one conceives of the role of teacher and the process of education. To the extent that education is seen as a completeable, specifiable, and determinable task or process, teacher information requirements would seem to be "knowable." But to the extent that education is viewed as a dynamic, evolving, open-ended, individual process--to that extent the information requirements of teachers would be non-specifiable and non-determinable. And hence, "unknowable" in advance. We can again ask: If teachers were good inquiring systems, what kind of information would they seek--what kinds of data systems would best serve their needs? And what kinds of assumptions are implicit in the attempt to build "information systems" which would attempt to functionally embody human concepts, ideas, and values?

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